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EXECUTIVE SUMMARY AND CONCLUSIONS

Summary

Musty odors are often associated with damp or water damaged buildings and are a frequent source of occupant complaints. These odors originate from the release of volatile organic chemicals from mold growth occurring on building materials and construction substrates. Known as microbial volatile organic compounds (MVOCs), these volatile chemicals represent a variety of chemical classes including alcohols, amines, aldehydes, ketones, sulfides and many other hydrocarbons. Common MVOCs identified in the literature include 1-octen-3-ol, geosmin, and 2-methylfuran. The final report on Phase I of this project was submitted January 26, 2001, as AQS Report 04799-01R. That report presented a review of scientific knowledge and issues surrounding MVOCs and their impact of building structures.

Phase II of this project, as summarized in this current report, includes laboratory studies of MVOC production by molds growing on various building materials and the identification of MVOCs as found in field studies of water-damaged buildings. The various study tasks presented and concluded in this report include:

Task 1: Identification and quantitation of specific MVOCs associated with various mold species;

Task 2: Identification of MVOCs generated by specific molds growing on selective building materials in simulated, realistic conditions;

Task 3: Identification of MVOCs indentified in building studies and correlation to laboratory findings of Tasks 1 and 2; and

Task 4: Preparation of a summary database of MVOCs identified in this research study.

Task 1 included the laboratory determination of MVOC profiles generated by 32 combinations of various molds. Results were previously reported to ASHRAE on February 27, 2004 as AQS Report # 09478-08. This report is included as Appendix 1 of this final report. In addition, results obtained in Tasks 2, 3, and 4 research efforts are presented in this final report, identified as the Phase II Report.

Conclusions

Key findings of this research study include:

1. Numerous MVOCs are released from active mold growth.

2. Specific MVOC emissions resulting from mold growth on building materials are dependent on both the type of mold and the specific host substrate.

3. The majority of these MVOCs are associated with a variety of mold types. Certain mold selective MVOCs were identified including methoxybenzene for Stachybotrys chartarum; benzothiazole and menthol were identified as potential indicators for Chaetomium globosum.

4. Extrapolation of laboratory data on the types and levels of MVOCs associated with defined mold growth to field (building) studies is not easily observed. Field data may be affected by numerous environmental and building parameters.

5. To observe MVOCs in a ventilated, large volume (open room) building environment, a large amount of mold coverage is needed to provide sufficient levels for analytical detection. However, much smaller amounts of mold coverage are required for detection of MVOCs in more confined spaces, such as wall cavities or quiescent ventilation ductwork.

6. The amount of mold coverage does not directly correlate with the amount of a given MVOC emission. It appears that some MVOCs are emitted at a much greater rate during the initial growth period, when coverage of the material by mold may be light, and emitted at a lower rate later, even though the visible mold coverage is greater.

FINAL REPORT

"Detection and Removal of Gaseous Effluents and By-Products of Fungal Growth That Affect Environments –Phase II: Development of a MVOC Database."

ASHRAE RESEARCH GRANT 1243-TRP

Presented to ASHRAE
By Air Quality Sciences, Inc.
September 9, 2005

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Approved
W. Elliott Horner, PhD
Principal Scientist

Marilyn S. Black, Ph.D.
____
Approved
Marilyn Black, PhD
Chief Scientist

Report Number: 09478-16

TABLE OF CONTENTS

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Summary

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"Field Effective" MVOCs

This was an extensive study to develop a database of MVOCs that might be practical in identifying the presence of mold growth in buildings. In order to be usable in these situations, an MVOC has one of the following characteristics:

1. Unique – it should be a compound that is not frequently emitted from other common indoor air pollution sources.

2. Predictable – its presence needs to be predictably observed in an environment with sustained mold growth.

3. Detectable – it needs to be emitted at a rate that will result in detectable levels for an amount of mold coverage.

Simply identifying a compound as coming from a mold source does not directly make it a useful MVOC for building investigations and moisture monitoring situations. Studies in the literature have traditionally been conducted in laboratory settings where MVOCs emitting from cultured mold in limited, controlled environments were identified. In general, these studies have not taken the next step of evaluating the applicability of identifying and measuring these MVOCs in moisture damaged building environments.

This research study showed that many MVOCs could be identified as being generated from mold growth. However, only a small number of the compounds have been shown to be effective in field/building studies. In this study one MVOC, methoxybenzene (also known as anisole), was found to be effective and reliable under the specific requirements stated above. This compound has the potential to be quite useful to indoor air researchers and investigators for the following reasons:

1. It is specific for Stachybotrys chartarum, a mold of great public concern and an excellent ecological indicator;

2. It is emitted when growing on gypsum wallboard, one of the substrates that most warrants a non-destructive investigative technique such as MVOC sampling. It also appears to emit from Stachybotrys chartarum growing on other building materials, including ceiling tiles and Kraft paper.

3. It is a very unique chemical and not commonly associated with general VOC emissions of products. This uniqueness is based on comparison to a VOC database containing over 15 years of data and thousands of air analyses from of the indoor environments and from material emissions.

4. Stachybotrys chartarum on gypsum wallboard releases large quantities of methoxybenzene so that it can be reliably detected under a fairly large range of conditions (e.g., air change rate, moisture content, area of coverage, etc).

Recommendations for Future Work

This research study provides a firm foundation for continuation of additional MVOC research. It is recommended that additional research efforts be focused on the following areas:

1. Determine and prioritize the most significant sources of water damage and mold growth in the U.S. building stock. This will allow additional studies of building materials, associated mold growth, and MVOC emissions to focus first and foremost on the most significant issues faced in buildings today. The findings from this effort will assist in identifying and prioritizing the types of substrates to be additionally studied (wallboard, insulation, etc) and the range of mold species that are commonly found on those materials in problem buildings.

2. Use the knowledge and data obtained from this current MVOC research effort along with information obtained in #1 above to conduct additional MVOC controlled laboratory studies. These studies should evaluate additional molds to determine specific MVOC markers. These efforts should include further study of benzothiazole and menthol, which appear to be potential unique markers for active growth of Chaetomium globosum. As additional markers are identified, sampling and analysis techniques should be validated, as it was for methoxybenzene in this study.

3. Conduct a large survey of buildings in varying geographic locations to assess, on a broader scale, the ability for mold specific MVOC markers to identify hidden mold and predict potential sources (wall cavities, HVAC ductwork).

INTRODUCTION

The objective of this research project was to develop a database of microbial volatile organic compounds (MVOCs) that are associated with types of mold growth found in problem building environments, and that are useful in determining the presence of hidden mold growing in indoor environments. An additional goal was to develop a scientifically validated sampling and analysis technique for MVOC detection as a supplement to conventional bioaerosol air analysis methodologies.

TASK 1: IDENTIFICATION OF MOLD SPECIFIC MVOCS

The purpose of Task 1 was to identify and quantify specific MVOCs associated with certain organisms grown on different materials. Selected species were grown and isolated in glass vessels in the laboratory. Following growth and incubation of the molds, air samples were obtained from the glass vessels using a passive VOC collection technique. The air samples were then analyzed using thermal desorption-gas chromatography/mass spectrometry. Specific emissions were identified using a mass spectrometric (GC/MS) database of common indoor contaminants and MVOCs. Based on the uniqueness and the levels of identified MVOCs, potential marker compounds were chosen for specific mold types. A detailed report of Task 1 procedures and findings was written and submitted to ASHRAE (AQS Report Number 09478-08). It is provided as Appendix 1 of this report. A summary of MVOCs found emitting from three key molds is summarized below:

TABLE 1
SUMMARY OF KEY MVOCS
MVOCS FOUND AMONG DIFFERENT BUILDING MATERIALS

MOLDS	MVOCs
Stachybotrys chartarum	Dimethyldisulfide Isopropyl acetate Methoxybenzene
Chaetomium globosum	1-Octen-3-ol 3-Octanone 5-Methyl-3-heptanone Geosmin
Aspergillus versicolor	1-Phenylethanone 2-Ethylfuran 2-Ethyl-2-hexenal 3-Methylbutanal Dimethyldisulfide

MVOCs identified are two times greater than positive control

It was found that mold growth on building products did produce a variety of MVOCs. However, only a limited number could be considered “markers” for specific mold types. The study found that over two dozen different MVOCs were identified. Measurements of the VOCs

produced in the controlled growth vessels were compared to those obtained from mold growing on building materials. Some common MVOCs were found to be consistent among the various growth media, including well-known MVOCs that are frequently reported in the literature, such as 3-methylfuran, 1-octen-3-ol, and 3-octanone.

Comparison of MVOCs generated by different molds growing on various building materials did yield interesting results. One of the most interesting was the persistent presence and identification of methoxybenzene (anisole) associated with the growth of Stachybotrys chartarum. This MVOC was present in large amounts from three primary building materials that supported the growth of Stachybotrys chartarum. These included gypsum wallboard, porous ceiling tile and Kraft paper. Methoxybenzene was also found in the headspace volume of Stachybotrys chartarum growing on B-malt culture medium. Methoxybenzene was not found to be a significant MVOC emission from any of the additional molds studied. It appears that methoxybenzene could be useful as a unique indicator MVOC for the growth and presence of Stachybotrys chartarum in building environments.

Chaetomium globosum is a mold that is often co-exists with Stachybotrys chartarum and is usually present in problem environments. MVOC results indicated that 1-octen-3-ol and 3-octanone were found to be consistent measurable indicators of this mold growing on ceiling tile and Kraft paper; however 1-octen-3-ol was not found from Chaetomium globosum growing on gypsum wallboard.

TASK 2: IDENTIFICATION OF MVOCS GENERATED BY CONTROLLED MOLD GROWTH ON SELECTIVE BUILDING MATERIALS IN SIMULATED REALISTIC CONDITIONS

The objective of Task 2 was to accurately determine MVOC emissions from building materials inoculated with mold and exposed under realistic environmental conditions (temperature, relative humidity, and ventilation air change rate). This testing was performed by placing inoculated materials into environmentally controlled chambers operating under dynamic conditions. Four building materials were studied for their usefulness as a standard substrate including oriented strand board, fibrous ceiling tile, Kraft paper, and gypsum wallboard.

These initial substrate studies revealed that oriented strand board did not sufficiently support mold growth, and this material was not chosen for further study.

While ceiling tile is often a source of mold growth in buildings, its installation and use often provides easy access for investigators to visually determine whether mold growth is occurring on this either side of this material. Since one purpose of MVOC sampling is targeted at identifying hidden mold growth, the use of ceiling tiles (which are readily observable in buildings) as a study substrate did not seem reasonable. Therefore, this material was not chosen for further study.

Kraft paper and gypsum wallboard were the final two materials considered for use as the standard substrate. These materials met two key criteria important for the study of MVOCs: 1) they readily support mold growth in problem indoor environments; and 2) they are installed and used in buildings in a manner that results in the subsequent mold growth being hidden. For example, mold growth can occur on the Kraft paper facing of batt insulation used in wall

cavities and, similarly, mold growth can occur on the backside (interior wall cavity) of gypsum wallboard. In addition, mold growth on gypsum wallboard can also occur under wallcovering materials on the occupancy side of the wallboard. In this case, the mold growth is often hidden as well. Based on the prevalent use of gypsum wallboard in buildings, its potential to account for mold coverage (in square footage) in problem environments is significant. Since it has the potential to be a significant host for hidden mold growth, gypsum wallboard was chosen as the subject substrate for this portion of the study.

Molds chosen for Task 2 studies included Stachybotrys chartarum and Chaetomium globosum. Stachybotrys chartarum is widely publicized as a mold of greatest concern from a health standpoint. Chaetomium globosum is commonly found in water-damaged environments. Because the two molds are often found together, it was decided that both would be used for this portion of the study.

Inoculation and Incubation of Gypsum Wallboard Panels Used in the Dynamic Chamber Studies

Five sets of gypsum wallboard were prepared, with each set consisting of five 12-inch by 12-inch by ½ inch pieces of gypsum wallboard (a total of 25 pieces). Four of the sets were inoculated using the following procedure. One was retained as a control.

The molds, Chaetomium globosum and Stachybotrys chartarum, were selected based on the results of the Task 1 study. Fresh panels of ½ inch gypsum wallboard were obtained commercially through a local building material supplier. Panels were cut into 12-inch by 12-inch squares. Five replicate squares were used for each treatment. Prior to use, all panels were wetted by being submerged in 18 megohm purified water for 30 minutes and followed by air drying for 30 minutes. Sets of replicate panels were then inoculated with aqueous suspensions of spores (1 - 2 x 10^5 CFU/ml) of either Chaetomium globosum, Stachybotrys chartarum or a mixture of the two. Panels were sprayed with a manual atomizer. Inoculated panels were incubated at room temperature in a humid chamber (approximately 100% RH) for either 9 days (light growth) or 16 days (heavy growth) before loading into the dynamic environmental chambers for further evaluation. The control (uninoculated) panels were wetted and dried in an identical manner to the inoculated panels, immediately prior to loading into the chambers.

Environmental Chamber Testing

Each of five sets of gypsum wallboard, as identified below, was loaded into either an 86 liter (controls and light growth) or a 94 liter (heavy growth) environmental chamber.

- Control set: uninoculated; no visible mold growth.
- Light growth of mixed molds (Chaetomium globosum and Stachybotrys chartarum) / Incubated 9 days.
- Heavy growth of mixed molds (Chaetomium globosum and Stachybotrys chartarum) / Incubated 16 days.
- Heavy growth of Chaetomium globosum) / Incubated 16 days.
- Heavy growth of Stachybotrys chartarum) / Incubated 16 days.

The exposed area of inoculated wallboard was approximately 1 m^2 resulting in a material to air volume loading of approximately 10 m^2/m^3. The environmental chamber protocol used for evaluating airborne MVOCs resulting from the inoculated materials included:

1. Measurement of an empty chamber background.

2. Placement/loading of panels into the chamber, followed by an overnight equilibration period at a minimal air change rate (0.4 air changes per hour [ACH]).

3. Collection of duplicate air samples following overnight equilibration.

4. Adjustment of air change rate to 0.8 ACH followed by a 4 hour re-equilibration period in the chamber. The 0.8 ACH was chosen to represent a typical building ventilation rate.

5. Collection of duplicate air samples at 0.8 ACH.

6. Return of the ACH to 0.4 and repeat steps 3 – 5.

Analytical Analysis of General VOCs and Target MVOCs

Environmental chamber operation and control measures used in this study complied with ASTM Standards D 5116-97 (1). The chambers used were manufactured from stainless steel with interiors polished to a mirror-like finish to minimize contaminant adsorption. Air flow through the chamber enters and exits through a aerodynamically designed air distribution manifolds also manufactured of stainless steel. Supply air to the chamber is stripped of formaldehyde, VOCs, particles, and other contaminants, so that any contaminant backgrounds present in the empty chamber fall below strict levels (< 10 μg/m^3 TVOC, < 10 μg/m^3 total particles, < 2 μg/m^3 formaldehyde, < 2 μg/m^3 for any individual VOC).

Air supply to the chambers was maintained at a temperature of 23ºC ± 2ºC and relative humidity at 50% ± 5%. The air exchange rate was adjusted to either 0.4 or 0.8 ACH, as indicated in the protocol.

Environmental chamber air was collected onto Tenax® sorbent tubes using a mass flow controller. Samples were collected over an approximately 90-minute period for a total volume of approximately 18 liters. In the laboratory, general VOCs (volatile organic compounds) and target MVOCs were analyzed using gas chromatography with mass spectrometric detection (GC/MS). Instrumentation included a Perkin-Elmer Turbo Matrix ATD or ATD 400 Thermal Desorption System, a Hewlett Packard 5890 Series II or 6890 Gas Chromatograph, and a Hewlett Packard 5973 Series Mass Selective Detector (GC/MS).

The sample collection technique, separation, and detection analysis methodology have been adapted from techniques presented by the U.S. EPA and other researchers. The technique follows EPA Method IP-1B and is applicable to VOCs that are efficiently adsorbed to and desorbed from the sorbent system for the amount of air sampled with boiling points ranging from 35^{o}C to 275^{o}C. The target list MVOCs that were specifically analyzed included: 3-methylfuran, 2-methyl-1-propanol, 1-butanol, 3-methyl-2-butanol, 2-pentanol, 3-methyl-1-butanol, dimethyl disulfide, ethyl isobutyrate, 2-hexanone, 2-heptanone, 5-methyl-3-

heptanone, 1-octen-3-ol, 3-octanone, 3-octanol, 2-pentylfuran, 2-octen-1-ol, 2-methoxy-3-1(methylethyl)pyrazine, 2-nonanone, fenchone, 2-methylisoborneol, alpha-terpineol, geosmin, thujopsene, anisole, and isopropyl acetate. Other VOCs detected in the analysis scan were also identified to assess their potential as useable MVOCs.

Target MVOCs were detected and each was quantified to its own authentic standard with multipoint calibration curve. The total MVOC (TMVOC) concentrations were determined by adding the measured responses of all individual MVOCs. Analysis of calibration curves and samples were performed using Hewlett Packard EnviroQuant analytical software. Individual MVOCs and TMVOC values are reported in ng/m^3. A detection limit for each specific individual MVOC was approximately 200 nanograms per cubic meter (ng/m^3) (equivalent to 0.2 micrograms per cubic meter, µg/m^3).

Calculation Methods

Emission factors for MVOCs, in nanograms (ng) released per area of mold exposed material (m^2), were calculated assuming a constant emission process using the following equation:

EF = Chamber Concentration * N / L

Where: *EF* is emission factor in units of ng/m^2 hr
N is the air change rate in units of m^3 / hr
L is the product loading in units of m^2 / m^3.

Room air concentrations were determined using the following equation:

Room Air Concentration = EF * Area / (N * Vol)

Where: *EF* is emission factor in units of ng/m^2 hr
Area is the area of mold coverage in units of m^2
N is the air change rate in units of m^3 / hr
Vol is the room volume in units of m^3.

This equation was rearranged to get the minimum area coverage required to detect MVOCs:

Area (minimum mold coverage) = MVOC analytical detection limit * N * Vol / EF

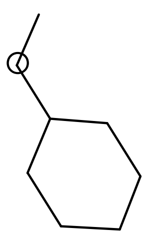
Results of Chamber Testing

Identification of VOCs and Target MVOCs

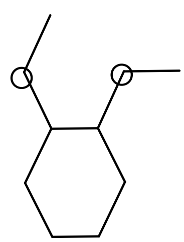
VOCs emitting from the inoculated material were numerous. All VOCs detected in Task 2 are included in Appendix 2. A general scan of all VOCs was conducted as reported in Tables 1 – 4. Both low volume (18 L) and high volume (24 L) air samples were collected on two consecutive days of growth. Different volumes were used to allow collection of a broader range of VOCs with different volatilities and collection characteristics. In addition, target MVOC analyses were completed using authentic standards of known as highly suspected MVOCs. These are reported in Tables 5 – 8.

MVOCs from Stachybotrys chartarum

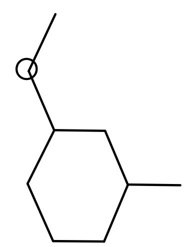
Analytical results obtained from the environmental chamber testing of inoculated materials showed consistency with results obtained in Task 1. The specific MVOC identified in Task 1 studies, methoxybenzene (or anisole), was also found in the chamber studies. This compound appeared to be an exclusive emission of Stachybotrys chartarum and was found to be emitting at significant levels from inoculated wallboard. Similar compounds were found to be emitting as well, including dimethoxybenzene and methylmethoxybenzene. The similarities among these compounds can be seen in the structures below:



Methoxybenzene

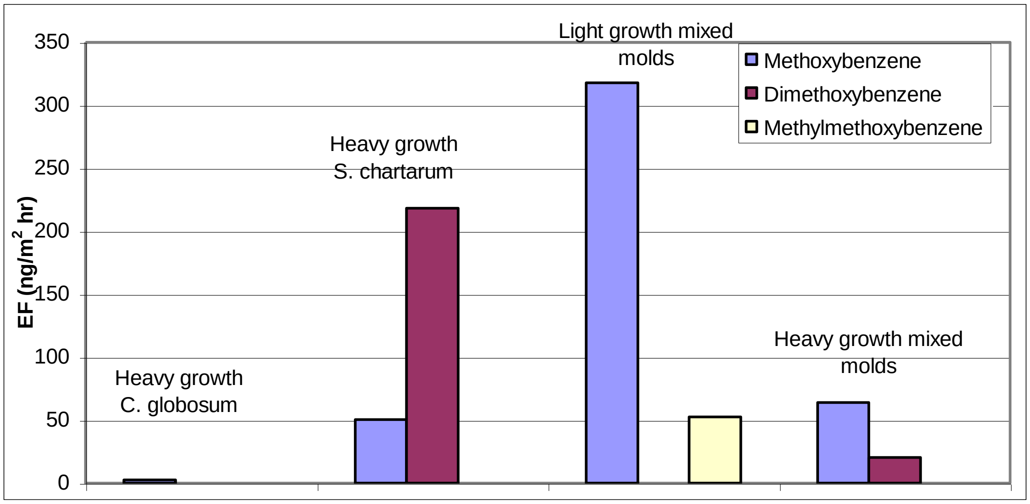


Dimethoxybenzene



Methylmethoxybenzene

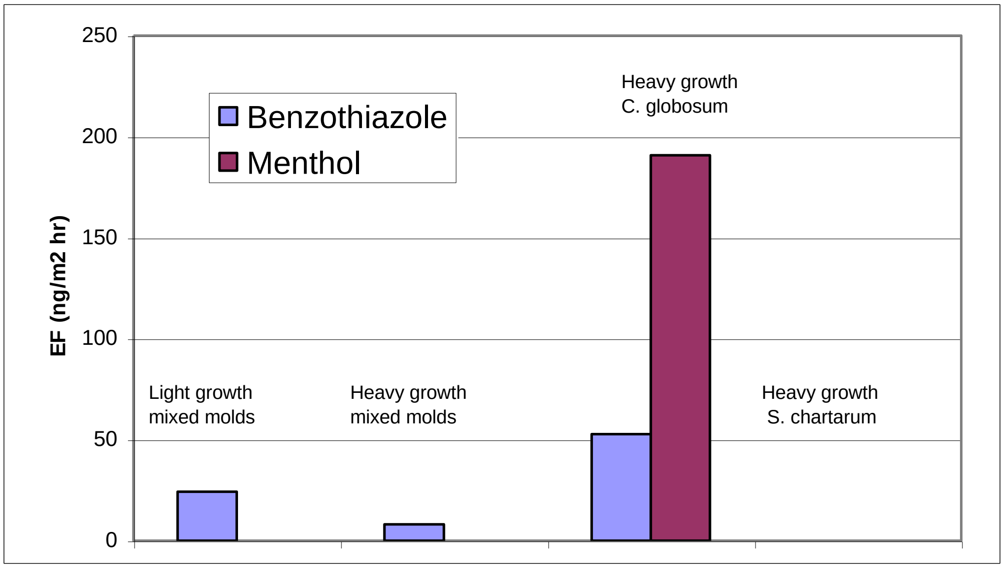
The levels of these specific MVOCs as measured among the colonized materials showed the following pattern:



The results indicate that Stachybotrys chartarum is a major producer of this MVOC, and Chaetomium globosum is not. This is consistent with the finding in Task 1 that methoxybenzene appears to be an exclusive emission of Stachybotrys chartarum. In addition, the emission factor of methoxybenzene in the "light growth mixed molds" sample is much greater than in the "heavy growth mixed molds" sample. This could be due to more rapid production during the initial growth period, with heavy visible growth of molds indicative of senescence. Perhaps more likely, the large amount of dimethoxybenzene found in the "heavy growth Stachybotrys chartarum" may indicate that methoxybenzene is an intermediate in a synthetic pathway towards a different compound. Supporting this metabolic intermediate theory is the presence of the related compound methylmethoxybenzene. In the report for Task 1, it was noted that while methoxybenzene had not been known to have been previously reported as an MVOC, Fischer et. al found 1-methoxy-3-methylbenzene (one isomer of methylmethoxybenzene) to be exclusively produced by Penicillium expansum (Fischer, 1999)(2).

MVOCs from Chaetomium globosum

The two compounds that appear to be selective emissions from Chaetomium globosum include benzothiazole and menthol:



While Task 2 efforts clearly indicate that these compounds are associated with Chaetomium globosum growth, Task 1 studies indicated their presence in some control samples. This may have been the result of contamination or may indicate the wetter wallboard material itself as a source. More conclusive studies are required to solidify the likelihood of benzothiazole and menthol as Chaetomium globosum specific MVOCs.

Survey of MVOCs

Chamber testing also identified a number of other MVOCs emitting from the colonized gypsum wallboard materials. Analytical results of the original target list of MVOCs and description of the associated mold substrate inoculation are provided in the table below:

MVOC	Light Growth Mixed Molds	Heavy Growth Mixed Molds	Heavy Growth Chaetomium globosum	Heavy Growth Stachybotrys chartarum
1-Butanol	✓	✓	✓	✓
1-Octen-3-ol	✓	✓	✓	✓
2-Heptanone	✓	✓	✓	✓
2-Hexanone	✓		✓	
2-Methyl-1-propanol	✓		✓	✓
2-Pentanol			✓	
2-Pentylfuran	✓	✓	✓	✓
3-Methylfuran	✓			
3-Methyl-2-butanol	✓		✓	
3-Octanol	✓	✓	✓	✓
3-Octanone	✓	✓	✓	✓
Borneol		✓	✓	✓
Dimethyl disulfide	✓	✓	✓	✓
Fenchone			✓	✓
Isopropyl acetate	✓	✓	✓	✓
Methoxybenzene	✓	✓		✓
α-Terpineol	✓	✓	✓	✓

A review of all measured emitting VOCs, indicated that a broader range of MVOCs (than the original target list) was being released by the inoculated materials. A more complete list of measured MVOCs present in significant levels is shown below. Units are present in nanograms (ng) of specific MVOC per cubic meter (m^3) of air. All testing was conducted at a chamber loading at 0.4 air change per hour.

Higher levels were generally found in the light growth test substrate. Those MVOCs with consistent emissions among all inoculated include 1-butanol, 1-octen-3-ol, 2-heptanone, 2-pentylfuran, 3-octanol, 3-octanone, dimethyl disulfide, isopropyl acetate and α-terpineol. Anisole or methoxybenzene was the only MVOC observed exclusively in Stachybotrys chartarum inoculates.

MVOCs
Chamber Air Concentration
ng/m³

Compound	**Light Growth**	**Heavy Growth**	**Chaetomium globosum**	**Stachybotrys chartarum**
1-Butanol	1,089	187	1,157	279
1-Octen-3-ol	1,040	404	632	647
2-Heptanone	725	340	563	309
2-Hexanone	513	nd	324	nd
2-Methoxy-3-1(methylethyl)pyrazine	nd	nd	nd	nd
2-Methyl-1-propanol	551	nd	275	93
2-Methylisoborneol	nd	nd	nd	nd
2-Nonanone	nd	nd	nd	nd
2-Octen-1-ol	nd	nd	nd	nd
2-Pentanol	nd	nd	147	nd
2-Pentylfuran	247	188	203	212
3-Methyl-1-butanol	nd	nd	nd	nd
3-Methyl-2-butanol	676	nd	591	nd
3-Methylfuran	55.0	nd	nd	nd
3-Octanol	547	197	1,063	137
3-Octanone	8,952	6,314	9,039	5,506
5-Methyl-3-heptanone	nd	nd	nd	nd
Anisole	9,221	1,357	nd	1,245
Borneol	nd	509	1,011	699
Dimethyl disulfide	225	275	175	214
Ethyl isobutyrate	nd	nd	nd	nd
Fenchone	nd	nd	294	109
Geosmin	nd	nd	nd	nd
Isopropyl acetate	1,106	2,914	1,471	503
Thujopsene	nd	nd	nd	nd
α-Terpineol	1,172	794	1,199	1,088
Total Microbial VOCs (TMVOCs)	**26,119**	**13,479**	**18,144**	**11,041**

nd = not detected

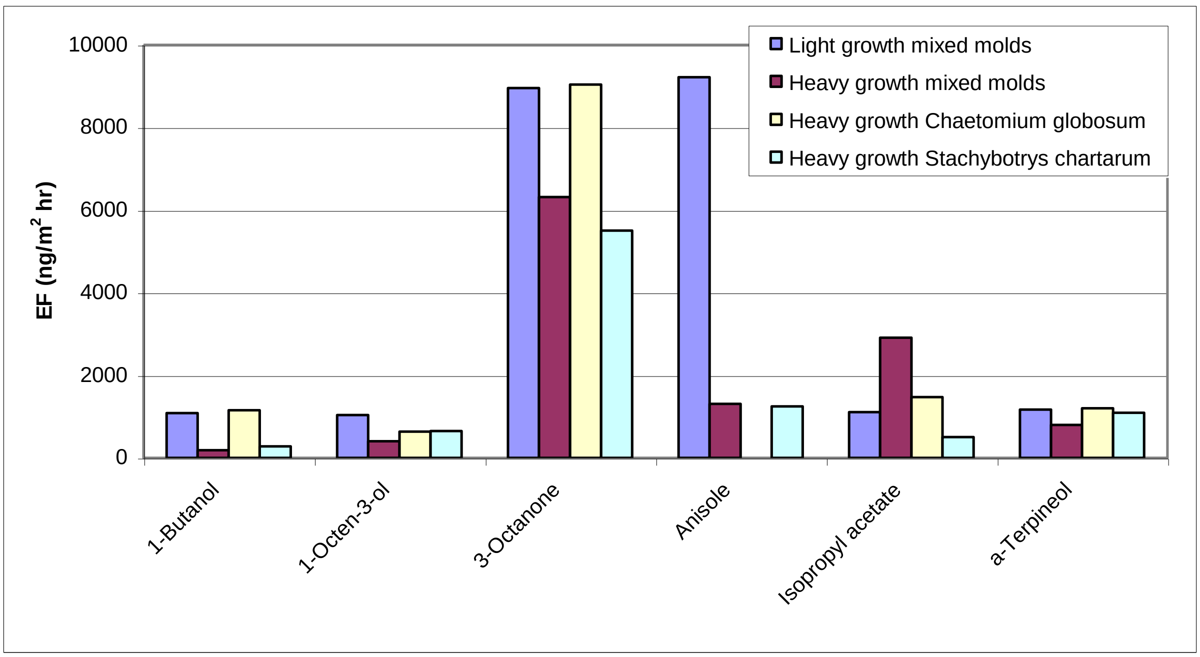
These findings further establish that molds produce a wide range of chemical metabolites and that these compounds can be identified and measured analytically.

Some of these MVOCs were also found to be emitting from the control set of gypsum wallboard at low levels. This may be the result of a difference in the preparation of the wallboard, as the wallboard for the control was wetted immediately prior to loading in the environmental chamber. Conversely, the test samples were wetted 9 to 16 days before the chamber was loaded. Because of the difference in preparation of control and test samples,

the findings of MVOCs in the control sample should not invalidate the results of the test samples. All reported results were corrected for low levels found in the control samples.

Interestingly, findings from the control data show that wetting of the paper covering the gypsum wallboard releases water soluble MVOCs. This may be caused by the wetting process triggering the release of MVOCs that were absorbed in the gypsum wallboard. These findings may also indicate that building materials, such as wet gypsum wallboard may emit detectable levels of MVOCs prior to installation even in the absence of visible mold growth. This may be the result of moisture exposure during or after manufacturing and prior to the use in buildings.

MVOCs that were present in mold-colonized samples but not present to any extent in the control samples are graphed below:



Minimum Mold Coverage for MVOC Detection

A practical consideration in using MVOC levels to detect mold growth is the need for guidelines on factors affecting MVOC concentration. These factors include the number of square feet colonized by mold, the ventilation rate and size of the space where the colonization is located. With accurately determined emission rates, however, it is possible to calculate the theoretical "minimum mold coverage" needed to trigger detection using the MVOC technique. The following equation was used to calculate the "minimum mold coverage":

Area (minimum mold coverage) = MVOC detection limit * N * Vol / EF

Where: *MVOC detection limit* is a required reliable detection limit of 200 ng/m^3
N is the ventilation rate (0.8 ACH for room; 0.2 ACH for wall cavity)
Vol is the volume of the room (32 m^3 for room; 1.7 m^3 for wall cavity)
EF is emission factor in units of ng/m^2 hr.

Area Coverage Need to Detect Mold on Gypsum Wallboard (m^2)			
	Center of Small Room	**Inside Wall Cavity**	**Notes**
Methoxybenzene	16 - 80	0.2 - 1.1	range based light to heavy mixed mold growth
Dimethoxybenzene	23	0.3	based on heavy Stachybotrys chartarum only
Anisole (Methylmethoxybenzene)	98	1.3	based on light growth mixed mold growth
Benzothiazole	21 - 630	2.8 - 8.4	range based light to heavy mixed mold growth
Menthol	27	0.4	based on heavy Chaetomium globosum only
3-Methylfuran	4300	57	based on light growth mixed mold growth
3-Methyl-2-butanol	247	3.3	based on light growth mixed mold growth
2-Pentanol	907	12	based on light growth mixed mold growth
3-Octanol	129 - 1040	1.7 - 14	range based light to heavy mixed mold growth
Fenchone	470 - 1230	6 - 16	range based light to heavy mixed mold growth
Borneol	130-195	1.7-2.6	range based light to heavy mixed mold growth

From this analysis it appears that wall cavity sampling is necessary when testing for mold-contaminated gypsum wallboard. Note that while 3-methylfuran was found when Stachybotrys chartarum grew on media (B-malt) in Task 1 at relatively high levels, it was not found in the gypsum wallboard headspace. While 3-methylfuran may be a very good MVOC in laboratory conditions, it may not be good in field conditions for gypsum wallboard.

TASK 3: COMPARING CHAMBER MVOC PREDICTIONS TO ACTUAL FIELD STUDIES

Three building studies were chosen for review. Moisture was an issue in all three buildings. The moisture issues varied and included suspect envelope leaks, plumbing system leaks and air infiltration. The principal substrate for mold growth in all three buildings was gypsum wallboard. Two of the buildings were in humid coastal areas and the third was in a semi-arid climate. All three buildings were hospitality/residential in nature and mechanical ventilation with outside air was provided to corridors of all three buildings. Although independent measures of mold growth in addition to MVOC samples were obtained from all three buildings, due to various constraints it was not practically possible to collect similar types of ancillary data in all cases.

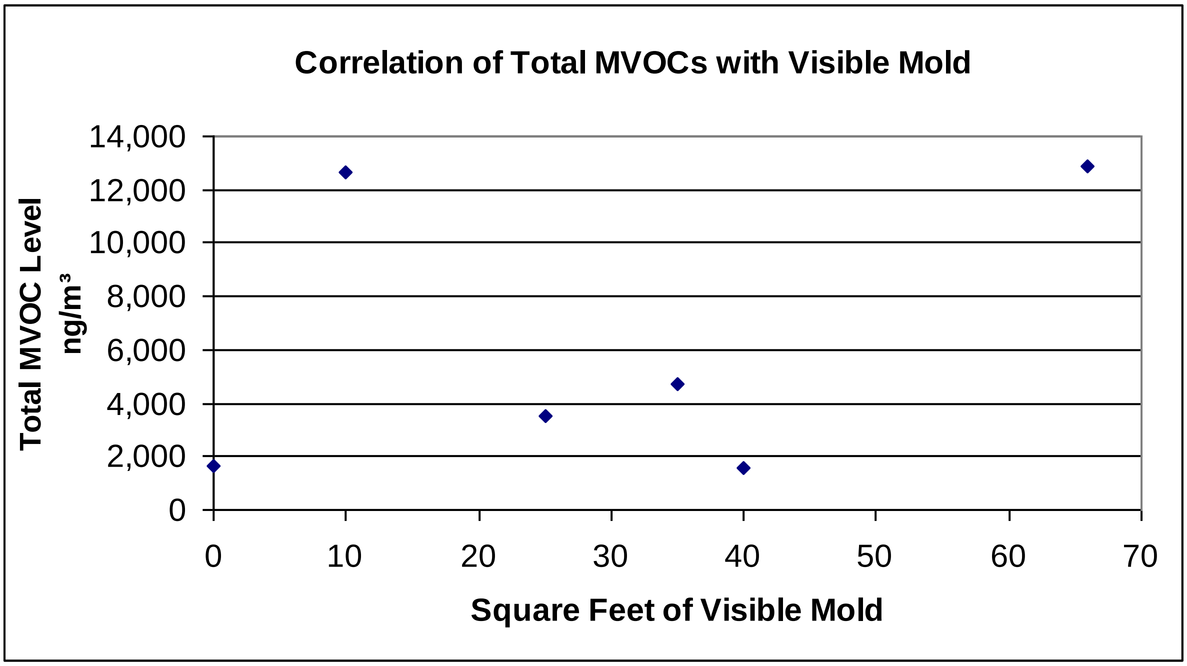
MVOC measurements obtained in the building studies were evaluated relative to the findings of this research study. The primary interest was to observe any potential correlation between controlled laboratory studies of MVOC production from colonized materials to what was found in certain building environments. MVOCs were detected in each of the three buildings evaluated as indicated below. A more detailed summary of each building is also detailed.

MVOCs	Building 1	Building 2	Building 3
3-methylfuran	✓		
1-butanol	✓	✓	✓
2-hexanone			✓
2-heptanone	✓	✓	✓
2-pentylfuran	✓	✓	✓
2-methyl-1-propanol	✓		
3-methyl-1-butanol	✓		
anisole (methoxybenzene)		✓	
benzothiazole		✓	✓
borneol	✓		✓
menthol	✓		

<u>Building 1</u>

MVOC samples were taken in this building as part of a mold remediation project. The area being tested was not occupied at the time of sampling but outside air was being supplied to the area. The amount of visible mold was recorded for six rooms in which MVOC samples were collected, including the room without visible mold. Visible mold was present in five of the rooms; the amount varied from approximately ten (10) square feet to over 60 square feet of visible mold per room. MVOCs were detected in all six samples. However, MVOC detection and total levels of the traditional compounds did not correlate with the observed amounts of visible mold in the rooms sampled (see figure below). However, this lack of correlation was likely a result of sample locations being at different stages of remediation. Therefore, the moisture content of materials in each location varied at the time of sampling. If this phenomenon is confirmed in future studies, it would indicate that the moisture status of the material is a significant cofactor of MVOC emissions and should be considered when

developing an MVOC sampling strategy. Menthol was detected in samples from three rooms, including the room with no visible mold.



Building 2

MVOC samples were collected in this building just prior to initiation of mold remediation. The HVAC system was operating, but portions of the building were already under containment at the time of sampling. Extensive amounts of visible mold were present in the wall voids of certain portions of the building. Independent means of assessing moisture levels in the building materials indicated that numerous portions of the building were still damp too wet at the time of sampling. Areas in excess of 20 square feet of visible mold were present in numerous areas in this building at the time of sampling. Six MVOC samples were collected in this building. Levels of the traditional MVOCs were less than 1000 ng/m^3 in all six indoor samples. However, Stachybotrys chartarum colonization was common on the gypsum wallboard in this building, and the detection of methoxybenzene generally correlated with wall cavity moisture levels determined independently. Three samples were collected in wall void areas where equilibrium moisture levels were documented. Equilibrium RH levels in one wall void were consistently in the range of 65% for the four (4) days preceding sampling. Methoxybenzene was not detected in this sample. The other two voids were consistently above 75% RH and 95% RH; methoxybenzene was detected both of these samples.

Building 3

Water intrusion through envelope leaks was suspected as the cause of visible mold development in this building. Mold development had previously been documented at multiple locations in the envelope of the building. However, much of the contaminated materials had been previously remediated and at the time of sampling, independent means of assessing the moisture levels in building materials indicated that the building materials were dry. In addition, the relative humidity in the building was consistently below 50% RH. Methoxybenzene was not detected in any of the samples. Generally, overall MVOC levels were quite low in these samples. Only a single compound (1-butanol) was present in any sample above 50 ng/m^3.

TASK 4: ANALYTICAL RESULTS IN USABLE FORMAT

All potential MVOCs measured in Task 1 and Task 2 are included on a CD-ROM in format.

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APPENDIX 1

APPENDIX 2

End of Task 1 of 1243-TRP
Report on Potential of Success

“Detection and Removal of Gaseous Effluents and By-Products of Fungal Growth That Affect Environments - Phase II: Development of a MVOC Database.”

Presented to the ASHRAE Subcommittee

by Air Quality Sciences, Inc.
August 12, 2005

AQS Report No. 09478-08R

TABLE OF CONTENTS

Introduction

The objective of this research is the development of a database of MVOCs that are associated with types of mold growth found in problem building environments, and that would be useful in determining the presence of hidden mold growing in indoor environments. Unlike past MVOC studies, an important goal is to develop a scientifically valid building investigation method, supporting MVOC analysis as an important supplement to conventional bioaerosol sampling techniques. The MVOC data is acquired using reliable scientific techniques generated through laboratory and in-situ studies.

It is well known that fungal growth produces emissions as a result of secondary metabolic processes, and it is feasible to measure MVOC emissions. The challenge in applying MVOC analysis to building investigations is to measure unique MVOCs that indicate with high confidence the presence of mold; in other words, the MVOCs should not be among the hundreds of common chemicals that emit from building materials and consumer products but should be specific indicators of mold growth. While the literature contains studies that have been performed to identify MVOC emissions on contaminated building materials, many of them do not reference the use of un-inoculated materials (negative controls); thus, it is not clear that these emissions being measured are from the mold itself. Also critical to the success of MVOC sampling paradigm are parameters associated with MVOC levels, such as ventilation rates and amount of mold growth, which, along with sensitivity of the analytical method, determine if MVOCs will be detected regardless of how much mold is present. Hence, an extremely important (and novel) component of this research is determination and validation of an MVOC sampling and analysis method.

Proposed Agenda for Task 1

The purpose of Task 1 was to identify and quantify specific MVOCs associated with specific organisms. The species were to be grown up in glass vessels, and samples of the atmosphere would be taken and analyzed. Emissions were to be identified using gas chromatography/mass spectrometry. Based on features of the chemicals, the best potential indicator compounds would be chosen for further study.

Research Performed to Date

Task I has been completed. Methods for growing, harvesting, and quantifying the growth of challenge organisms were optimized. The method that was developed for fungal preparation, inoculation, weekly monitoring and population verification is included as Appendix A. Initially, it was planned that stoppered Erlenmeyer flasks would be used as the vessels for collecting MVOCs. However, early studies indicated unacceptable VOC contamination, presumably due to emissions from the different types of stoppers that were used. After further research, the use of glass jars with Teflon-lined lids was found to be acceptable.

Procurement of Mold-Contaminated Building Materials

Four types of building materials were used. Sample sets of each type were moistened, and then inoculated separately with each of six test organisms. Inoculated sets (plus one uninoculated control) were then incubated for three weeks at 25^{o}C.

Building Materials

Drywall
Ceiling Tile
Kraft paper
Oriented Strand Board

Building materials were selected based on the common problem building materials found in building investigations.

Fungal Species

Stachybotrys chartarum
Cladosporium sphaerospermum
Chaetomium globosum
Eurotium amstelodami
Aspergillus versicolor
Aspergillus versicolor (duplicate)
Aspergillus sydowii
Control (uninoculated)

Mold species were selected that are typical of those recovered from water-damaged buildings. Thus, 32 environments were created. Building materials were wetted with sterile water to insure growth. This methodology is given in Appendix A. To indicate the amount of moisture added, dry weights (2 hrs at 120^{o}C) were recorded and then wet weights were recorded after moistening the samples. These are given in Appendix B.

VOCs were passively collected from set-up through the end of one, two, and three week incubation periods for each of the fungus/building material combination. Pictures of some of the test vessels are included in Appendix C. Qualitative observations of the growth were recorded every week and are included as Appendix D. Four weeks after initial inoculation, a quantitative evaluation of fungal growth was performed. The results are included as Appendix E. Oriented Strand Board was found to be a difficult medium for mold growth. This may be due to the high level of aldehydes typically emitted from new manufactured wood products which may be toxic to molds.

In order to better resolve building material emissions from true MVOCs, the six species (+ 1 uninoculated control) were also cultivated on appropriate growth media in specially prepared “French Squares”, whereby media was applied to 4 sides of this square vessel. Samples acquired from these “French Squares” were considered the “positive controls”. A sample of the atmosphere in these vessels was measured after eight days of exposure.

Chemical Analysis

Chemical analysis was performed using thermal desorption-gas chromatography/mass spectrometry (TD-GC/MS). The data was analyzed first using a target list approach for 23 known MVOCs. The advantage of this analysis is a very low detection limit and ease of identifying target compounds from the analytical and environmental noise. Secondarily, compounds were identified using an AQS library of common indoor VOCs. This library contains mass spectral and retention time information acquired through the analysis of authentic standards. For the remaining compounds that could not be matched with compounds in the AQS database, the 2002 Mass Spectral Database from the National Instituted of Standards & Technology (NIST) was used. The advantage of this approach is the identification of thousands of potential chemicals. Further details about the analytical method, including sorbent type and quality assurance, are given in Appendix F.

Analytical Results & Discussion

The entire set of MVOC data is provided in Appendix H, while the entire set of VOC data is provided in Appendix I. The format of each is the same.

From analysis of the datasets, the most likely useful emissions were selected, and are summarized in this section. Factors that went into selection of the most likely compounds are as follows:

1. Was the emission in the positive control?
2. Was the emission was in the control at significant levels?
3. Was the emission in the sample at significant (or barely detectable) levels?
4. What was the difference between the levels in the control, as compared to the level of the other compounds in the same sample?
5. Was the emission common across the mold types?
6. Was the emission common across materials?
7. Was the emission a predictable MVOC based on its structure?
8. Was the emission a predictable MVOC based on literature?
9. Was the emission a chemical known to emit from the building product?
10. Was the emission unique enough to be a MVOC? (Is it a common VOC found in indoor environments?)

Many VOCs of potential microbial origin were found to emit from the building materials. However, they were not good candidates for the purpose of this study,

which was to find compounds that could be used as specific markers for microbial growth. Some of them were known MVOCs but were in the negative controls as well as the mold contaminated samples. Examples of this include 2-hexanone, 2-heptanone and 2- pentylfuran. In some cases known MVOCs were at high levels in the mold contaminated samples and not in the controls, but they were known to be common material related VOCs. Examples include styrene and ethanol. In some cases, interesting VOCs were found that, while they are not currently known to be MVOCs, their presence in the samples and not the control blanks indicated they might be unique markers. However, the levels were so low that their detection in actual environments would be unlikely.

Of the six fungal species studied, the three of greatest significance to indoor mold investigations and with the most interesting MVOC potential are Stachybotrys chartarum, Aspergillus versicolor and Chaetomium globosum. Summary tables and findings are given below.

Stachybotrys chartarum

Compounds that appear to be good indicators of Stachybotrys chartarum were selected from the data in Appendices G and H, and are summarized in Table 1. Dimethyldisulfide was a compound in each of the drywall samples that contained the fungal species, was in the positive control (Stachybotrys chartarum on B-Malt), and was not in the drywall control blanks. Thus, dimethyldisulfide is a potentially effective indicator of Stachybotrys chartarum on drywall. Dimethyldisulfide is believed to come from the sulfur-containing amino acid methionine. (Wessen et. al, 2001).

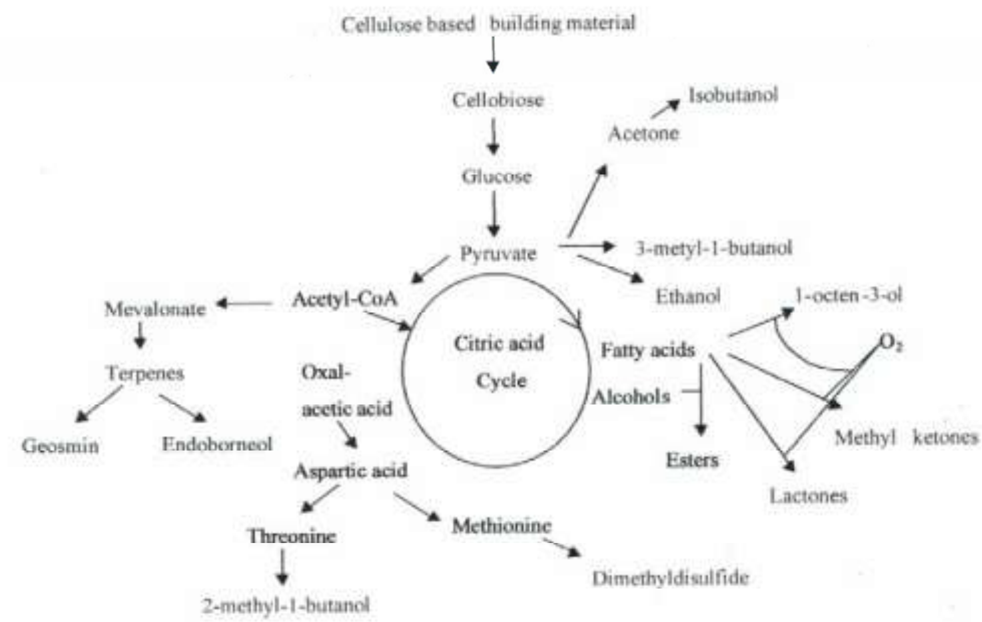

Figure 1:Metabolic pathways leading to the production of some volatile metabolites by microorganisms growing on cellulose. (Wesson et al., 2001)

Isopropyl acetate also appears to be due to the fungal growth. Acetate is considered the most important precursor in the biosynthesis of volatile fungal metabolites (Larsen et al., 1998) and many different acetate esters have been identified as fungal emissions.

Perhaps the most interesting volatile emission is methoxybenzene, also known as anisole. It is present in large amounts from all three materials that Stachybotrys chartarum grew well on (drywall, ceiling tile, and kraft paper). Because methoxybenzene, or anisole, is not commonly found in indoor environments, it may turn out to be an important indicator of Stachybotrys chartarum on common building materials. Methoxybenzene has not been reported in the literature as an important MVOC, but some related compounds have been described. For example, Bjurman et al. (1997) found 4-allylanisole from Penicillium on pinewood, and Fischer et. al found 1-methoxy-3-methylbenzene to be exclusively produced by Penicillium expansum (1999).

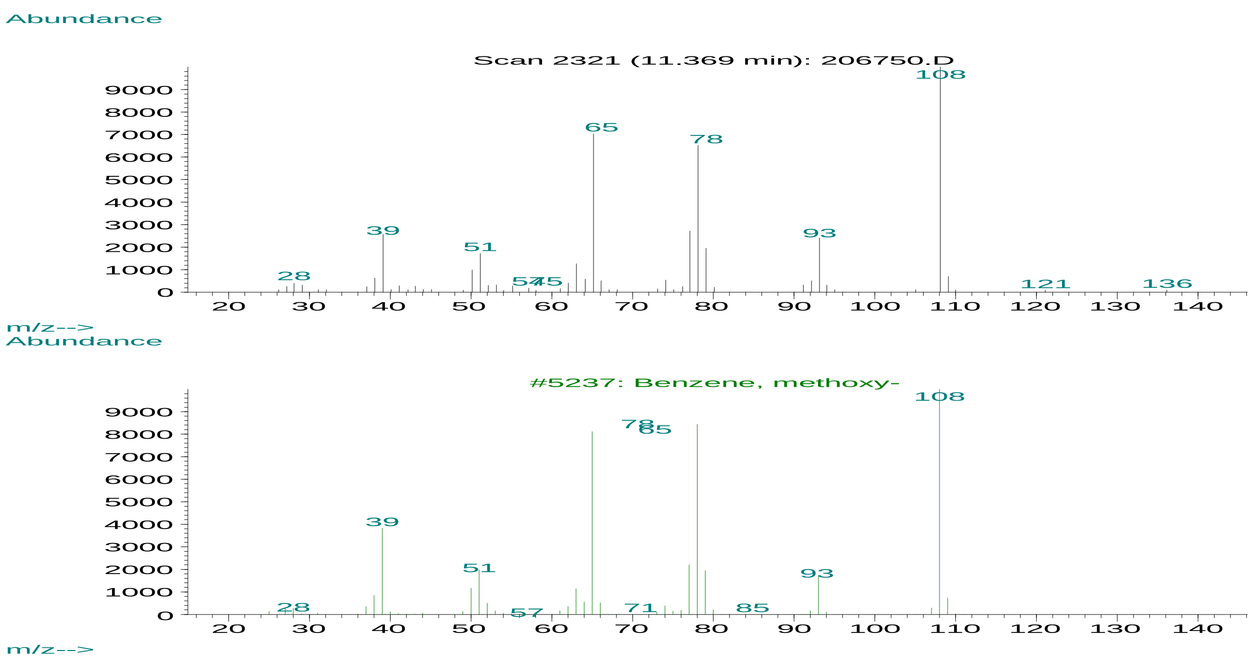

Figure 2: Mass spectrum of methoxybenzene in sample (top) and reference (bottom)

Chaetomium globosum

MVOCs 1-octen-3-ol and 3-octanone were found in the emissions from this species. These are unique compounds, not found in typical indoor environments or from common building material. These are likely to come from metabolic processes involving linoleic acid (Matsui et. al., 2003.)

Aspergillus versicolor

Dimethyldisulfide appears to be a good MVOC indicator for both Stachybotrys chartarum and Aspergillus versicolor. Although this compound is a common bacterial emission and is therefore not unique to Aspergillus versicolor, its presence in an indoor environment certainly indicates a biological source. Other interesting emissions that were not in the background include 3-methylbutanal, 2-ethyl-1-furan, phenyl ethanone and a well-known MVOC, 3-methylfuran. 2-Ethyl-2-hexenal may be related to the linoleic acid metabolite and was found in many samples. This compound warrants close inspection as this study progresses.

Table 1: MVOC Emissions of Interest Observed from Stachybotrys chartarum (ng)

Organism	None/Control			Stachybotrys chartarum			
Test	**Week 1**	**Week 2**	**Week 3**	**Week 1**	**Week 2**	**Week 3**	**Positive Control**
Drywall							
Dimethyldisulfide				10.5	17.6	9.6	9.3
Isopropyl acetate						34.9	
Methoxybenzene				98.1	458	468	10.2
Ceiling Tile							
Isopropyl acetate				9.2	30.3	20.1	
Methoxybenzene				42.3	113	112	10.2
Kraft Paper							
Dimethyldisulfide						9.7	9.3
Isopropyl acetate						13.9	
Methoxybenzene				166	134	424	10.2

Table 2: MVOC Emissions of Interest Observed from Chaetomium globosum (ng)

Organism	None/Control			Chaetomium globosum			
Test	**Week 1**	**Week 2**	**Week 3**	**Week 1**	**Week 2**	**Week 3**	**Positive Control**
Drywall							
5-Methyl-3-heptanone					108		
3-Octanone					111		29.9
Ceiling Tile							
1-Octen-3-ol				24.7	35.9	79.3	
3-Octanone				127	195	481	29.9
Oriented Strand Board							
Geosmin				8.5			
Kraft Paper							
3-Octanone				40.9	84.2	99.8	29.9

Table 3: MVOC Emissions of Interest Observed from Aspergillus versicolor (ng)

Organism	None / control			Aspergillus versicolor			
Test	**Week 1**	**Week 2**	**Week 3**	**Week 1**	**Week 2**	**Week 3**	**Positive Control**
Drywall							
Dimethyldisulfide				38.1	22.0	19.7	
3-Methylbutanal				13.6	12.5	4.7	
Ceiling Tile							
3-Methylfuran				nq	nq	nq	21.7
3-Methylbutanal					14.5	10.4	
2-Ethylfuran				21.7	12.7	8.7	
Kraft Paper							
1-Nonanol						5.1	
2-Ethyl-2-hexenal				30.4	96.4	71.1	
1-Phenylethanone				2.1	55.8	54.3	

"nq" denotes compound present but not quantifiable due to interference.

Proposed Agenda for Task 2.

The purpose of this task is to determine MVOCs under realistic building conditions and to establish effective sampling procedures. This involves determining the building parameters under which detection of MVOCs is likely to produce certain identification when mold is present. From Task 1, it was learned that the mold growth on the building products was too low to produce strong, unequivocal detection. In addition, it was seen that the MVOCs were associated with the fungal species, and not dependant on the material they were growing on. Therefore, the best way to proceed is to focus on specific species growing on specific material. It is important to control the variables for the most certain MVOC detection method.

The fungal species, Stachybotrys chartarum and Chaetomium globosum, are often found together in wet environments. Additionally, they are high-visibility, well-known problem building molds. Therefore, Task 2 will focus on these two molds.

Of the four building materials, new, oriented strand board was found to be a difficult substrate for effective mold growth. Ceiling tile is a frequently found mold contaminated material in buildings. However, checking for hidden mold growth often requires removal of the suspected tiles and observation of the back. Since ceiling tiles are readily accessible and replaceable, this process is nondestructive. In contrast, detection of growth behind drywall can be costly and time consuming as it typically requires destructive removal of suspected sections. However, it has been suggested that MVOCs could be measured by taking a sample through a small hole in the drywall, or through an electrical outlet. Since a simple study approach may be feasible and since the drywall is a frequently found mold contaminated materical in buildings, it was chosen as the substrate for this study.

It is recommended that the study move forward using the following subjects in environmental test chambers.

1.) Control Drywall (uninoculated)
2.) Stachybotrys chartarum on Drywall (heavy growth)
3.) Chaetomium globosum on Drywall (heavy growth)
4.) Stachybotrys chartarum and Chaetomium globosum on Drywall (heavy growth)
5.) Stachybotrys chartarum and Chaetomium globosum on Drywall (moderate growth)

Testing will be performed under low air change rate (about 0.35 air changes per hour). This is lower than typically found in actual commercial building environments, and more similar to what is found in a personal residence. However, this will maximize the detectable amount of MVOCs. Emission rates at other air-change rates can be easily calculated from using a linear equation. The difference of the impact on growth levels (heavy versus light) on MVOC production is not clearly understood, and this matrix will allow for observation of growth level impact. Additionally, the heavier growth may allow for the identification of more MVOCs than were observed in Task 1. Authentic standards will be used for the compounds of interest determined in Task 1 for accurate quantitation and indentification.

Based on the results of this study, it should be possible to predict the required building conditions for effective use of MVOC detection as an indicator of hidden mold growth. Parameters specified include air-change rate, loading (amount of mold coverage per room volume), and growth level. For example, it may be determined that for low mold growth, it is necessary to reduce air-change rate to minimal levels for 24 hours prior to sampling to ensure a probable success, or it may be necessary to take the sample from behind the drywall (through a sampling hole) rather than in the room to detect low mold growth.

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Appendix A

Method for Fungal Preparation, Inoculation, Weekly Monitoring, and Population Verification

ASHRAE Study Fungal Preparation, Inoculation, Weekly Monitoring, and Population Verification

A. Purpose

a. The purpose of this procedure is to detail the steps required for the fungal preparation, inoculation, weekly monitoring, and population verification of test materials used for the ASHRAE Study.

B. Test Materials:

a. OSB – Oriented Strand Board
b. Drywall – Gypsum Board
c. Ceiling Tile
d. Kraft Paper

C. Test Organisms:

a. Chaetomium globosum
b. Aspergillus sydowii
c. Cladosporium sphaerospermum
d. Eurotium amstelodomi
e. Stachybotrys chartarum
f. Aspergillus versicolor

D. Materials and Supplies

a. Petri Dishes – 15 mm X 100 mm
b. Pipets – 2 ml, 10 ml, and 25 ml
c. Cotton Tip Applicator Swabs - Sterile
d. Cell Scrapers - Sterile
e. Glass Filter Funnel - Sterile
f. Glass Wool - Sterile
g. Aluminum Foil or Sterilization Pouches
h. Centrifuge Tubes – 10 ml and 50 ml
i. 10 ml Sterile Dilution Tubes
j. Hemocytometer with Cover Slip
k. KimWipes
l. Laboratory Wipes

E. Media and Reagents

a. 0.9% NaCl Solution
b. Pep-tween Solution
c. Potato Dextrose Agar
d. CY20S Agar
e. BMALT Agar
f. 70% Alcohol

F. Equipment

a. Class II Biological Safety Cabinet
b. Centrifuge – Capable of reaching
c. Vortex Mixer
d. Microscope – 10X and 40X Magnification
e. Incubator - 25°C
f. Timer, Calibrated

G. Fungal Preparation

a. For each organism being prepared, obtain 5 pre-prepared petri dishes containing the appropriate growth medium. Note: For the purpose of this study PDA was used for the cultivation of *S. chartarum*, *C. globosum*, and *C. sphaerospermum*; CY20S was used for *A. sydowii* and *E. amstelodomi*; BMALT was used for *A. versicolor*.
b. Obtain a previously isolated culture of each of the test organisms ensuring that the morphological characteristics of the culture are consistent with the desired organism.
c. Aseptically moisten the end of a cotton tip applicator with Pep-tween solution, and gently roll the end of the applicator in the desired test organism culture.
d. Lawn streak the surface of each of five plates of the appropriate growth medium for each organism.
e. Carefully wrap the outer edge of each plate with Parafilm to ensure that fungal contamination does not enter the test plate.
f. Repeat steps c through e for each test organism.
g. Place all inoculated plates into a 25°C incubator for 5 to 7 days or until sufficient colonization and sporulation has occurred.
h. Remove plates from incubation, and select the 2 or 3 best plates for further processing.

H. Fungal Harvesting and Inoculum Preparation

a. To each of the plates retained from step G.h., add 10 ml of Pep-tween solution.
b. Using a Cell Scraper, gently rub the surface of each plate in order to bring the fungal spores into suspension. Note: Care should be taken not to break the agar during the harvesting process. If gross contamination of mycelial fragments and/or agar chucks are harvested with the spores, the entire wash suspension should be filtered through a sterile glass filter funnel lined with sterile glass wool before proceeding to step H.c.
c. Collect the harvest solution from each of the test organism plate into a 50 ml centrifuge tube. One centrifuge tube should be used for each test organism.
d. Vortex each suspension for 2 minutes then place the tubes into a entrifuge for 20 minutes at a minimum rpm of 3500.
e. Following centrifugation, decant the liquid from each test organism suspension. Retain the pellet from each tube for further washings.

f. To each of the centrifuge tubes add 10ml of 0.9% NaCl solution and vortex for 1 minute.
g. Place each of the tubes back into the centrifuge for 20 minutes at a minimum rpm of 3500.
h. Repeat steps H.e. though H.g. one additional time
i. Following the second centrifugation in 0.9% NaCl, decant the liquid one additional time, followed by the addition of 10 ml NaCl. This is now the stock suspension that will be used for preparation of the test inoculum.
j. Using a Hemocytometer and microscope, count the number of spores per ml of stock suspension.
k. After determining the number of spores per ml of stock suspension, serially dilute each stock suspension in 0.9% NaCl solution to yield a final nominal population of 7.0×10^5 to 2.0×10^6. The population of this suspension should be verified by means of a standard plate count.
l. The solutions as prepared above for each test organism are the inoculum suspensions with will be used for further testing.

I. Preparation and Inoculation of Test Materials

a. All test materials should sterilized in dry heat for 2 hours at 121°C prior to inoculation.
b. The test materials should be of suitable size and capable of fitting into the desire test container or test chamber.
c. The weight of each material should be taken immediately prior to inoculation. Record these values onto the appropriate data collection worksheet for future reference.
d. To the surface of each test material, place approximately 2 ml of inoculum suspension as prepared in step H.i. Each material type should be inoculated with a separate fungal culture.
e. Re-weigh each of the inoculated test materials and record the data for future reference.
f. Place each of the inoculated test materials into an appropriately labeled test container and place into incubation. Note: The incubation temperature and duration of incubation will be determined by the Analytical Testing Laboratory and/or the test sponsor.

J. Weekly Monitoring of Test Materials

a. Weekly visual observations of the test materials should be made in order to obtain the general rate of fungal colonization per test organism and material type.
b. Visual ratings should be made according to the following rating scale:

Growth Rating:
0 = No visual growth observed
1 = Trace amount of growth observed (less than 10% coverage of material surface)
2 = Light growth observed (11-30% coverage of material surface)
3 = Moderate growth observed (31-60% coverage of material surface)
4 = Heavy growth observed (61-100% coverage of material surface)

c. Visual assessment should also be made with regard to the moisture content of each test container. Enough moisture should be present in order to sustain the viability of the fungal species.
d. If no moisture is observed or if the moisture content appears to be low, then 2 ml of 0.9% NaCl solution may be added to each of the test containers.
e. Analytical test samples may also be taken during incubation. Check with the appropriate Analytical laboratory personnel for the sampling regime.

K. Population Verification

a. At the appropriate time period, a sample from each test container should be removed and used to determine the fungal population per weight of material.
b. Upon removing the test material piece from the test container, weigh each piece and record the information on the appropriate data collection record. Note: A sample weighing approximately 1 g is ideal, but may not be feasible for all material types.
c. Place each material into a test tube containing 10 ml of Pep-tween solution.
d. Vortex each test tube for one minute and then allow the solution to sit for approximately 30 minutes. This will help to soften the test material and aid in the dissolution of the test organism.
e. Plate serial dilutions for each test material/test organism type onto the appropriate growth medium.
f. Place all test plates into a 25°C incubator for 4 to 7 days.
g. Following incubation, remove all of the test plates and quantitate. Record the data on an appropriate data collection record for additional evaluation.

Appendix B
Initial Weights of Test Materials

Appendix B; Table 1

Initial Weight of Test Materials: Dry Weight and Wet Weight

	Test Material							
Test Organism	**OSB**		**Ceiling Tile**		**Drywall**		**Kraft Paper**	
	Dry	**Wet**	**Dry**	**Wet**	**Dry**	**Wet**	**Dry**	**Wet**
Stachybotrys chartarum	68.5 g	72.5 g	61.5 g	64.7 g	105.6 g	108.6 g	3.7 g	6.2 g
Chaetomium globosum	62.7 g	66.6 g	60.4 g	63.8 g	99.95 g	102.9 g	3.6 g	6.0 g
Eurotium amstelodami	66.2 g	69.8 g	59.7 g	63.1 g	108.3 g	112.0 g	3.7 g	5.8 g
Cladosporium sphaerospermum	66.1 g	69.9g	56.5 g	60.5 g	94.3 g	97.8 g	4.1 g	7.3 g
Aspergillus sydowii	64.3 g	68.1 g	60.7 g	64.5 g	109.9 g	113.3 g	3.5 g	6.1 g
Uninoculated Control	62.5 g	64.5 g	61.0 g	65.9 g	105.6 g	109.2 g	3.5 g	6.8 g

Comments:
The "dry" weight of each material was taken after each material had been subjected to a 2-Hour 121°C dry heat sterilization cycle. The "wet" weight of each material was taken immediately following inoculation with the test organism suspension and prior to placing them into their respective test containers.

Appendix B; Table 2

Initial Weight of Test Materials: Dry Weight and Wet Weight

	Test Material							
Test Organism	**OSB**		**Ceiling Tile**		**Drywall**		**Kraft Paper**	
	Dry	**Wet**	**Dry**	**Wet**	**Dry**	**Wet**	**Dry**	**Wet**
Aspergillus versicolor (Replicate 1)	52.1 g	53.6 g	46.8 g	51.5 g	102.3 g	105.1 g	3.4 g	6.5 g
Aspergillus versicolor (Replicate 2)	50.0 g	51.1 g	55.4 g	59.5 g	103.8 g	106.4 g	3.6 g	7.5 g
Uninoculated Control	52.7 g	54.0 g	25.3 g	27.4 g	41.8 g	42.9 g	4.5 g	8.3 g

Comments:
The "dry" weight of each material was taken after each material had been subjected to a 2-Hour 121°C dry heat sterilization cycle. The "wet" weight of each material was taken immediately following inoculation with the test organism suspension and prior to placing them into their respective test containers.

Appendix C
Photographs of Test Vessels

Appendix C, Figure 1: Close-up of uninoculated OSB control specimens in growth/exposure chambers.

Appendix C, Figure 2: Examples of representative materials in growth/exposure chambers at time of inoculation.

Appendix C, Figure 3: Visible growth of <u>Chaetomium</u> <u>globosum</u> on gypsum wallboard at 2 weeks.

Appendix C, Figure 4: Visible growth of <u>Cladosporium</u> <u>cladosporioides</u> on gypsum wallboard at 3 weeks.

Appendix C, Figure 5: Visible growth of Aspergillus versicolor on ceiling tile at 3 weeks.

Appendix D
Qualitative Evaluation of Fungal Growth

Appendix D; Table 1

Weekly Observation Chart: Week 1 – 1-21-03

	Test Material			
Test Organism	**OSB***	**Ceiling Tile***	**Drywall***	**Kraft Paper**
Stachybotrys chartarum	1	3	4	2
Chaetomium globosum	0	1	2	1
Eurotium amstelodami	0	2	4	1
Cladosporium sphaerospermum	0	2	4	4
Aspergillus sydowii	0	3	4	1
Uninoculated Control	0	0	2**	0

Growth Rating:

0 = No visual growth observed
1 = Trace amount of growth observed (less than 10% coverage of material surface)
2 = Light growth observed (11-30% coverage of material surface)
3 = Moderate growth observed (31-60% coverage of material surface)
4 = Heavy growth observed (61-100% coverage of material surface)

Comments:

*2 ml of 0.9% NaCl was added to each of these containers per organism and uninoculated Control to ensure organism viability during prolonged incubation.

**Test Material showed evidence of fungal contamination. Contaminant appeared to be Aspergillus niger.

Appendix D; Table 2

Weekly Observation Chart: Week 2 – 1-28-03

	Test Material			
Test Organism	**OSB***	**Ceiling Tile***	**Drywall***	**Kraft Paper**
Stachybotrys chartarum	1	3	4	2
Chaetomium globosum	1	1	4	1
Eurotium amstelodami	0	2	4	1
Cladosporium sphaerospermum	0	2	4	4
Aspergillus sydowii	1	4	4	1
Uninoculated Control	0	0	4**	0

Growth Rating:

0 = No visual growth observed
1 = Trace amount of growth observed (less than 10% coverage of material surface)
2 = Light growth observed (11-30% coverage of material surface)
3 = Moderate growth observed (31-60% coverage of material surface)
4 = Heavy growth observed (61-100% coverage of material surface)

Comments:

*2 ml of 0.9% NaCl was added to each of these containers per organism and uninoculated Control to ensure organism viability during prolonged incubation.

**Test Material showed evidence of fungal contamination. Contaminant appeared to be Aspergillus niger.

Appendix D; Table 3
Weekly Observation Chart: Week 3 – 2-4-03

	Test Material			
Test Organism	**OSB***	**Ceiling Tile***	**Drywall***	**Kraft Paper***
Stachybotrys chartarum	1	4	4	3
Chaetomium globosum	1	1	4	1
Eurotium amstelodami	1	2	4	1
Cladosporium sphaerospermum	1	2	4	4
Aspergillus sydowii	1	4	4	2
Uninoculated Control	0	0	4**	0

Growth Rating:

0 = No visual growth observed
1 = Trace amount of growth observed (less than 10% coverage of material surface)
2 = Light growth observed (11-30% coverage of material surface)
3 = Moderate growth observed (31-60% coverage of material surface)
4 = Heavy growth observed (61-100% coverage of material surface)

Comments:

*2 ml of 0.9% NaCl was added to each of these containers per organism and uninoculated Control to ensure organism viability during prolonged incubation.

**Test Material showed evidence of fungal contamination. Contaminate appeared to be Aspergillus niger.

Appendix D; Table 4
Weekly Observation Chart: <u>Week 4 – 2-11-03</u>

	Test Material			
Test Organism	**OSB***	**Ceiling Tile***	**Drywall***	**Kraft Paper**
<u>Stachybotrys chartarum</u>	1	4	4	3
Chaetomium globosum	1	1	4	1
Eurotium amstelodami	1	2	4	1
Cladosporium sphaerospermum	1	2	4	4
Aspergillus sydowii	1	4	4	2
Uninoculated Control	0	0	4**	0

Growth Rating:

0 = No visual growth observed
1 = Trace amount of growth observed (less than 10% coverage of material surface)
2 = Light growth observed (11-30% coverage of material surface)
3 = Moderate growth observed (31-60% coverage of material surface)
4 = Heavy growth observed (61-100% coverage of material surface)

Comments:

*2 ml of 0.9% NaCl was added to each of these containers per organism and uninoculated Control to ensure organism viability during prolonged incubation.

**Test Material showed evidence of fungal contamination. Contaminate appeared to be multiple fungal species.

Appendix E
Quantitative Evaluation of Fungal Growth

Appendix E; Table 1

Quantitative Evaluation of Fungal Colonization: Weight of Material Tested: Week 4 – 2-11-03

	Test Material			
Test Organism	**OSB**	**Ceiling Tile**	**Drywall**	**Kraft Paper**
Stachybotrys chartarum	13.9 g	1.7 g	1.0 g	1.1 g
Chaetomium globosum	14.4 g	1.6 g	1.2 g	1.0 g
Eurotium amstelodami	14.5 g	1.3 g	1.5 g	1.0 g
Cladosporium sphaerospermum	14.3 g	1.4 g	1.2 g	1.1 g
Aspergillus sydowii	13.4 g	1.3 g	1.2 g	1.2 g
Uninoculated Control	13.3 g	1.0 g	1.0 g	1.0 g

Comment:

A sample of each test material was taken from each of the test containers and subjected to a quantitative evaluation to determine the fungal population per weight of material following 4 weeks of incubation. The weight of each material was taken immediately upon being removed from its respective test container. The weight of each material reflects the "wet" weight. No dry weight of material was taken as the sample was consumed during the conduct of the evaluation.

Appendix F
VOC Analytical Methodology

Analytical Methodology for Volatile Organic Compounds

VOC measurements were made using gas chromatography with mass spectrometric detection (GC/MS). Air was passively collected onto a solid sorbent (Tenax-TA) which was then thermally desorbed into the GC/MS. Instrumentation included a sample concentrator, a Hewlett-Packard 5890 Series II or 6890 Series Gas Chromatograph and a Hewlett-Packard 5971 or 5973 Mass Selective Detector (GC/MS).

The sorbent collection technique, separation, and detection analysis methodology has been adapted from techniques presented by the USEPA and other researchers. The technique follows EPA Method IP-1B and is generally applicable to C_5 - C_{16} organic chemicals with boiling points ranging from 35°C to 230°C.[19-22] It has a detection limit of 0.5 $\mu g/m^3$ for most individual VOCs and TVOC.

Individual VOCs were separated and detected by GC/MS. VOCs are calibrated to authentic standards for the MVOC quantitation procedure, and to toluene for the IVOC quantitation procedure.

Individual VOCs were identified using AQS' specialized indoor air mass spectral database. Other compounds were identified with less certainty using a general mass spectral library available from the National Institute of Standards and Technology (NIST). This library contains mass spectral characteristics of more than 75,000 compounds as made available from NIST, the USEPA and the National Institutes of Health (NIH). A match is first sought in the AQS database, which includes data for the gas chromatographic retention time of the compound in addition to the mass spectrum. This additional information, along with the use of spectra generated on AQS equipment, makes confidence in identifications made from the AQS database higher than in identifications made using only the NIST/EPA/NIH mass spectral library.

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Appendix G
MVOC Target List Results

Table G-1: MVOC Target List Emissions from Stachybotrys chartarum on Drywall (ng)

Substrate	**Drywall**						**B-Malt**
Organism	**None / control**			**Stachybotrys chartarum**			
MVOC Test	**Week 1**	**Week 2**	**Week 3**	**Week 1**	**Week 2**	**Week 3**	**Positive Control**
3-Methylfuran							193.04
2-Methyl-1-Propanol							
1-Butanol							
3-Methyl-2-butanol							
2-Pentanol							
3-Methyl-1-butanol							
Dimethyldisulfide				10.45	17.61	9.63	9.32
Ethyl isobuyrate							
2-Hexanone				8.55	16.21	22.3	
2-Heptanone		18.64	c		31.05	36.19	
5-Methyl-3-heptanone							
1-Octen-3-ol							
3-Octanone							
3-Octanol							
2-Pentylfuran	8.69	9.23	c		10.29	9.47	
2-Octen-1-ol							
3-Methoxy-3-1(methylethyl)							
2-Nonanone							
Fenchone							
Borneol							
Alpha-terpineol							
Geosmin							
Thujopsene							

Table G-2: MVOC Target List Emissions from Cladosporium sphaerosperumum on Drywall (ng)

Substrate	**Drywall**						**Positive Control**
Organism	**None / control**			**Cladosporium sphaerospermum**			
MVOC Test	**Week 1**	**Week 2**	**Week 3**	**Week 1**	**Week 2**	**Week 3**	**Positive Control**
3-Methylfuran							
2-Methyl-1-Propanol							
1-Butanol							
3-Methyl-2-butanol							
2-Pentanol							
3-Methyl-1-butanol							
Dimethyldisulfide							
Ethyl isobuyrate							
2-Hexanone							
2-Heptanone		18.64	c				
5-Methyl-3-heptanone							
1-Octen-3-ol							
3-Octanone							
3-Octanol							
2-Pentylfuran	8.69	9.23	c		14.31	16.19	
2-Octen-1-ol							
3-Methoxy-3-1(methylethyl)							
2-Nonanone							
Fenchone							
Borneol							
Alpha-terpineol							
Geosmin							
Thujopsene							

Table G-3: MVOC Target List Emissions from Aspergillus sydowii on Drywall (ng)

Test	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Organism	None / control	None / control	None / control	Aspergillus sydowii	Aspergillus sydowii	Aspergillus sydowii	Aspergillus sydowii
MVOC Substrate	Drywall	Drywall	Drywall	Drywall	Drywall	Drywall	CYA
3-Methylfuran							29.58
2-Methyl-1-Propanol							
1-Butanol							
3-Methyl-2-butanol							
2-Pentanol							
3-Methyl-1-butanol							
Dimethyldisulfide					10.68		7.6
Ethyl isobuyrate							
2-Hexanone					15.73	24.32	
2-Heptanone		18.64	c		16.14	25.36	
5-Methyl-3-heptanone							
1-Octen-3-ol							69.55
3-Octanone							
3-Octanol							
2-Pentylfuran	8.69	9.23	c	5.15	7.32	10.49	68.96
2-Octen-1-ol							
3-Methoxy-3-1(methylethyl)							
2-Nonanone							
Fenchone							
Borneol							
Alpha-terpineol							
Geosmin							
Thujopsene							48

Table G-4: MVOC Target List Emissions from Eurotium amstelodami on Drywall (ng)

Test	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Organism	None / control	None / control	None / control	Eurotium amstelodami	Eurotium amstelodami	Eurotium amstelodami	Eurotium amstelodami
MVOC Substrate	Drywall	Drywall	Drywall	Drywall	Drywall	Drywall	CYA
3-Methylfuran							
2-Methyl-1-Propanol							
1-Butanol							
3-Methyl-2-butanol							
2-Pentanol							
3-Methyl-1-butanol							
Dimethyldisulfide							2873
Ethyl isobuyrate							
2-Hexanone					34.82	26.61	
2-Heptanone		18.64	c	12.55	50.13	40.43	29.65
5-Methyl-3-heptanone							
1-Octen-3-ol							144.8
3-Octanone							50.46
3-Octanol							
2-Pentylfuran	8.69	9.23	c	5.94	20.58	16.21	87.71
2-Octen-1-ol							
3-Methoxy-3-1(methylethyl)							
2-Nonanone							
Fenchone							
Borneol							
Alpha-terpineol							
Geosmin							
Thujopsene							

Table G-5: MVOC Target List Emissions from Chaetomium globosum on Drywall (ng)

Test	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Organism	None / control	None / control	None / control	Chaetomium globosum	Chaetomium globosum	Chaetomium globosum	Chaetomium globosum
MVOC Substrate	Drywall	Drywall	Drywall	Drywall	Drywall	Drywall	Cellulose
3-Methylfuran							
2-Methyl-1-Propanol							
1-Butanol							
3-Methyl-2-butanol							
2-Pentanol							
3-Methyl-1-butanol							
Dimethyldisulfide							
Ethyl isobuyrate							
2-Hexanone							
2-Heptanone		18.64	c	14.31	105.71		
5-Methyl-3-heptanone					107.5		
1-Octen-3-ol							
3-Octanone					111.31		29.86
3-Octanol							
2-Pentylfuran	8.69	9.23	c		21.64		
2-Octen-1-ol							
3-Methoxy-3-1(methylethyl)							
2-Nonanone							
Fenchone							
Borneol							
Alpha-terpineol							
Geosmin							
Thujopsene							

Table G-6: MVOC Target List Emissions from Aspergillus versicolor on Drywall (ng)

Test	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Organism	None / control	None / control	None / control	Aspergillus versicolor	Aspergillus versicolor	Aspergillus versicolor	Aspergillus versicolor
MVOC Substrate	Drywall	Drywall	Drywall	Drywall	Drywall	Drywall	CYA
3-Methylfuran							21.72
2-Methyl-1-Propanol							
1-Butanol							
3-Methyl-2-butanol							
2-Pentanol							
3-Methyl-1-butanol							
Dimethyldisulfide				38.14	22.04	19.74	
Ethyl isobuyrate							
2-Hexanone	9.5	7.6	12.41	13.3	11.4	12.34	
2-Heptanone	18.83	19.37	20.77	15.91	14.08	15.85	
5-Methyl-3-heptanone							
1-Octen-3-ol							
3-Octanone							
3-Octanol							
2-Pentylfuran	8.46	5.96	9.36	9.07	7	9.35	
2-Octen-1-ol							
3-Methoxy-3-1(methylethyl)							
2-Nonanone							
Fenchone							
Borneol							
Alpha-terpineol							
Geosmin							
Thujopsene							

Table G-7: MVOC Target List Emissions from Aspergillus versicolor on Drywall (Duplicate Experiment) (ng)

Test	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Organism	Control	Control	Control	Aspergillus versicolor	Aspergillus versicolor	Aspergillus versicolor	Aspergillus versicolor
MVOC Substrate	Drywall	Drywall	Drywall	Drywall	Drywall	Drywall	CYA
3-Methylfuran							21.72
2-Methyl-1-Propanol							
1-Butanol							
3-Methyl-2-butanol							
2-Pentanol							
3-Methyl-1-butanol							
Dimethyldisulfide				22.57	16.1	11.13	
Ethyl isobuyrate							
2-Hexanone	9.5	7.6	12.41	9.59	9.73	10.52	
2-Heptanone	18.83	19.37	20.77	11.24	13.21	14.23	
5-Methyl-3-heptanone							
1-Octen-3-ol							
3-Octanone							
3-Octanol							
2-Pentylfuran	8.46	5.96	9.36	7.23	8.82	11.59	
2-Octen-1-ol							
3-Methoxy-3-1(methylethyl)							
2-Nonanone							
Fenchone							
Borneol							
Alpha-terpineol							
Geosmin							
Thujopsene							

Table G-8: MVOC Target List Emissions from Stachybotrys chartarum on Ceiling Tile (ng)

Test	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Organism	None / control	None / control	None / control	Stachybotrys chartarum	Stachybotrys chartarum	Stachybotrys chartarum	Stachybotrys chartarum
MVOC / Substrate	Ceiling Tile	Ceiling Tile	Ceiling Tile	Ceiling Tile	Ceiling Tile	Ceiling Tile	B-Malt
3-Methylfuran							193.04
2-Methyl-1-Propanol							
1-Butanol					10.03		
3-Methyl-2-butanol							
2-Pentanol							
3-Methyl-1-butanol							
Dimethyldisulfide							9.32
Ethyl isobuyrate							
2-Hexanone			37.34		34.91	20.79	
2-Heptanone			33.54		18.72		
5-Methyl-3-heptanone							
1-Octen-3-ol							
3-Octanone							
3-Octanol							
2-Pentylfuran	16.19	14.51	78.61	6.93	50.14	24.38	
2-Octen-1-ol							
3-Methoxy-3-1(methylethyl)							
2-Nonanone							
Fenchone							
Borneol							
Alpha-terpineol							
Geosmin							
Thujopsene							

Table G-9: MVOC Target List Emissions from Cladosporium sphaerospermum on Ceiling Tile (ng)

Test	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Organism	None / control	None / control	None / control	Cladosporium sphaerospermum	Cladosporium sphaerospermum	Cladosporium sphaerospermum	Cladosporium sphaerospermum
MVOC Substrate	Ceiling Tile	Ceiling Tile	Ceiling Tile	Ceiling Tile	Ceiling Tile	Ceiling Tile	B-Malt
3-Methylfuran							
2-Methyl-1-Propanol							
1-Butanol							
3-Methyl-2-butanol							
2-Pentanol							
3-Methyl-1-butanol							
Dimethyldisulfide							
Ethyl isobuyrate							
2-Hexanone			37.34				
2-Heptanone			33.54				
5-Methyl-3-heptanone							
1-Octen-3-ol							
3-Octanone							
3-Octanol							
2-Pentylfuran	16.19	14.51	78.61	13.16	20.67	69.46	
2-Octen-1-ol							
3-Methoxy-3-1(methylethyl)							
2-Nonanone							
Fenchone							
Borneol							
Alpha-terpineol							
Geosmin							
Thujopsene							

Table G-10: MVOC Target List Emissions from Aspergillus sydowii on Ceiling Tile (ng)

Test	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Organism	None / control	None / control	None / control	Aspergillus sydowii	Aspergillus sydowii	Aspergillus sydowii	Aspergillus sydowii
MVOC Substrate	Ceiling Tile	Ceiling Tile	Ceiling Tile	Ceiling Tile	Ceiling Tile	Ceiling Tile	CYA
3-Methylfuran						13.12	29.58
2-Methyl-1-Propanol							
1-Butanol							
3-Methyl-2-butanol							
2-Pentanol							
3-Methyl-1-butanol							
Dimethyldisulfide							7.6
Ethyl isobuyrate							
2-Hexanone			37.34		13.44		
2-Heptanone			33.54				
5-Methyl-3-heptanone							
1-Octen-3-ol					21.32	13.97	69.55
3-Octanone					19.62		
3-Octanol							
2-Pentylfuran	16.19	14.51	78.61	23.77	35.67	10.74	68.96
2-Octen-1-ol							
3-Methoxy-3-1(methylethyl)							
2-Nonanone							
Fenchone							
Borneol							
Alpha-terpineol							
Geosmin							
Thujopsene							48.0

Table G-11: MVOC Target List Emissions from Eurotium amstelodami on Ceiling Tile (ng)

Test	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Organism	None / control	None / control	None / control	Eurotium amstelodami	Eurotium amstelodami	Eurotium amstelodami	Eurotium amstelodami
MVOC Substrate	Ceiling Tile	Ceiling Tile	Ceiling Tile	Ceiling Tile	Ceiling Tile	Ceiling Tile	CYA
3-Methylfuran							
2-Methyl-1-Propanol					16.57		
1-Butanol						21.08	
3-Methyl-2-butanol							
2-Pentanol							
3-Methyl-1-butanol							
Dimethyldisulfide							2873
Ethyl isobuyrate							
2-Hexanone			37.34		67.73	52.09	
2-Heptanone			33.54		46.43	70.03	29.65
5-Methyl-3-heptanone							
1-Octen-3-ol							144.8
3-Octanone							50.46
3-Octanol							
2-Pentylfuran	16.19	14.51	78.61	6.66	106.5	98.6	87.71
2-Octen-1-ol							
3-Methoxy-3-1(methylethyl)							
2-Nonanone							
Fenchone							
Borneol							
Alpha-terpineol							
Geosmin							
Thujopsene							

Table G-12: MVOC Target List Emissions from Chaetomium globosum on Ceiling Tile (ng)

Test	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Organism	None / control	None / control	None / control	Chaetomium globosum	Chaetomium globosum	Chaetomium globosum	Chaetomium globosum
MVOC Substrate	Ceiling Tile	Ceiling Tile	Ceiling Tile	Ceiling Tile	Ceiling Tile	Ceiling Tile	Cellulose
3-Methylfuran							
2-Methyl-1-Propanol							
1-Butanol							
3-Methyl-2-butanol							
2-Pentanol							
3-Methyl-1-butanol							
Dimethyldisulfide							
Ethyl isobuyrate							
2-Hexanone			37.34	15.54	69.12	107.52	
2-Heptanone			33.54		60.23	74.62	
5-Methyl-3-heptanone							
1-Octen-3-ol				24.72	38.86	79.33	
3-Octanone				126.61	194.99	481.29	29.86
3-Octanol							
2-Pentylfuran	16.19	14.51	78.61	22.27	66.45	108.05	
2-Octen-1-ol							
3-Methoxy-3-1(methylethyl)							
2-Nonanone							
Fenchone							
Borneol							
Alpha-terpineol							
Geosmin							
Thujopsene							

Table G-13: MVOC Target List Emissions from Aspergillus versicolor on Ceiling Tile (ng)

Test	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Organism	None / control	None / control	None / control	Aspergillus versicolor	Aspergillus versicolor	Aspergillus versicolor	Aspergillus versicolor
MVOC Substrate	Ceiling Tile	Ceiling Tile	Ceiling Tile	Ceiling Tile	Ceiling Tile	Ceiling Tile	CYA
3-Methylfuran				c	c	c	21.72
2-Methyl-1-Propanol					7.61		
1-Butanol							
3-Methyl-2-butanol							
2-Pentanol							
3-Methyl-1-butanol							
Dimethyldisulfide							
Ethyl isobuyrate							
2-Hexanone	13.82	19.55	23.47	23.58	24.69	26.93	
2-Heptanone	11.01	10.98	14.45	20.97	c	17.57	
5-Methyl-3-heptanone	13.52		18.01				
1-Octen-3-ol							
3-Octanone							
3-Octanol							
2-Pentylfuran	47.65	78.85	66.87	84.91	74.88	144.04	
2-Octen-1-ol							
3-Methoxy-3-1(methylethyl)							
2-Nonanone							
Fenchone							
Borneol							
Alpha-terpineol							
Geosmin							
Thujopsene							

Table G-14: MVOC Target List Emissions from Aspergillus versicolor on Ceiling Tile (Duplicate Experiment) (ng)

Test	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Organism	None / control	None / control	None / control	Aspergillus versicolor	Aspergillus versicolor	Aspergillus versicolor	Aspergillus versicolor
MVOC Substrate	Ceiling Tile	Ceiling Tile	Ceiling Tile	Ceiling Tile	Ceiling Tile	Ceiling Tile	CYA
3-Methylfuran				c	c	21.29	21.72
2-Methyl-1-Propanol							
1-Butanol							
3-Methyl-2-butanol							
2-Pentanol							
3-Methyl-1-butanol							
Dimethyldisulfide							
Ethyl isobuyrate							
2-Hexanone	13.82	19.55	23.47	14.65	20.95	15.68	
2-Heptanone	11.01	10.98	14.45	13.36	16.95		
5-Methyl-3-heptanone	13.52		18.01	16.39	17.07		
1-Octen-3-ol							
3-Octanone							
3-Octanol							
2-Pentylfuran	47.65	78.85	66.87	80.84	148.5	1403.3	
2-Octen-1-ol							
3-Methoxy-3-1(methylethyl)							
2-Nonanone							
Fenchone							
Borneol							
Alpha-terpineol							
Geosmin							
Thujopsene							

Table G-15: MVOC Target List Emissions from Stachybotrys chartarum on Oriented Strand Board (ng)

Test	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Organism	None / control	None / control	None / control	Stachybotrys chartarum	Stachybotrys chartarum	Stachybotrys chartarum	Stachybotrys chartarum
MVOC Substrate	OSB	OSB	OSB	OSB	OSB	OSB	B-Malt
3-Methylfuran	11.57			19.72	c		193.04
2-Methyl-1-Propanol							
1-Butanol	36.3						
3-Methyl-2-butanol							
2-Pentanol							
3-Methyl-1-butanol							
Dimethyldisulfide							9.32
Ethyl isobuyrate							
2-Hexanone	11.09	116.34	166.48	132	101	283	
2-Heptanone	111.12	278.8	430.78	369	455	650	
5-Methyl-3-heptanone							
1-Octen-3-ol							
3-Octanone							
3-Octanol							
2-Pentylfuran	205.83	384.52	500.42	494	723	766	
2-Octen-1-ol							
3-Methoxy-3-1(methylethyl)							
2-Nonanone							
Fenchone							
Borneol	13.73	13.76	16.42	45.3	71.3	92.5	
Alpha-terpineol	9.54			9.63	12.6	18.6	
Geosmin							
Thujopsene							

Table G-16: MVOC Target List Emissions from Cladosporium sphaerospermum on Oriented Strand Board (ng)

Test	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Organism	None / control	None / control	None / control	Cladosporium sphaerospermum	Cladosporium sphaerospermum	Cladosporium sphaerospermum	Cladosporium sphaerosprmum
MVOC Substrate	OSB	OSB	OSB	OSB	OSB	OSB	B-Malt
3-Methylfuran	11.57						
2-Methyl-1-Propanol							
1-Butanol	36.3						
3-Methyl-2-butanol							
2-Pentanol							
3-Methyl-1-butanol							
Dimethyldisulfide							
Ethyl isobuyrate				89.57			
2-Hexanone	11.09	116.34	166.48	89.05	239.35	386.25	
2-Heptanone	111.12	278.8	430.78		561.64	1065.43	
5-Methyl-3-heptanone							
1-Octen-3-ol							
3-Octanone							
3-Octanol				105.15			
2-Pentylfuran	205.83	384.52	500.42		470.25	836.42	
2-Octen-1-ol							
3-Methoxy-3-1(methylethyl)							
2-Nonanone				c			
Fenchone							
Borneol	13.73	13.76	16.42	7.5			
Alpha-terpineol	9.54				12.13	11.73	
Geosmin							
Thujopsene							

Table G-17: MVOC Target List Emissions from Aspergillus sydowii on Oriented Strand Board (ng)

Test	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Organism	None / control	None / control	None / control	Aspergillus sydowii	Aspergillus sydowii	Aspergillus sydowii	Aspergillus sydowii
MVOC / Substrate	OSB	OSB	OSB	OSB	OSB	OSB	CYA
3-Methylfuran	11.57						29.58
2-Methyl-1-Propanol							
1-Butanol	36.3						
3-Methyl-2-butanol							
2-Pentanol							
3-Methyl-1-butanol							
Dimethyldisulfide							7.6
Ethyl isobuyrate							
2-Hexanone	11.09	116.34	166.48	51.7	424	902	
2-Heptanone	111.12	278.8	430.78	84.8	503	985	
5-Methyl-3-heptanone							
1-Octen-3-ol							69.55
3-Octanone							
3-Octanol							
2-Pentylfuran	205.83	384.52	500.42	200.43	249	302	68.96
2-Octen-1-ol							
3-Methoxy-3-1(methylethyl)							
2-Nonanone							
Fenchone							
Borneol	13.73	13.76	16.42	80.71	11.2		
Alpha-terpineol	9.54			9.44		15.8	
Geosmin							
Thujopsene							48

Table G-18: MVOC Target List Emissions from Eurotium amstelodami on Oriented Strand Board (ng)

Test	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Organism	None / control	None / control	None / control	Eurotium amstelodami	Eurotium amstelodami	Eurotium amstelodami	Eurotium amstelodami
MVOC Substrate	OSB	OSB	OSB	OSB	OSB	OSB	CYA
3-Methylfuran	11.57			10.32			
2-Methyl-1-Propanol							
1-Butanol	36.3						
3-Methyl-2-butanol							
2-Pentanol							
3-Methyl-1-butanol							
Dimethyldisulfide							2873
Ethyl isobuyrate							
2-Hexanone	11.09	116.34	166.48	82.76	1946.81	5287	
2-Heptanone	111.12	278.8	430.78	143.18	2336.16	5503	29.65
5-Methyl-3-heptanone							
1-Octen-3-ol							144.8
3-Octanone							50.46
3-Octanol							
2-Pentylfuran	205.83	384.52	500.42	87.72	722.11	1068.6	87.71
2-Octen-1-ol							
3-Methoxy-3-1(methylethyl)							
2-Nonanone							
Fenchone							
Borneol	13.73	13.76	16.42				
Alpha-terpineol	9.54			5.81	14.37	24.28	
Geosmin							
Thujopsene							

Table G-19: MVOC Target List Emissions from Chaetomium globosum on Oriented Strand Board (ng)

Test	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Organism	None / control	None / control	None / control	Chaetomium globosum	Chaetomium globosum	Chaetomium globosum	Chaetomium globosum
MVOC Substrate	OSB	OSB	OSB	OSB	OSB	OSB	Cellulose
3-Methylfuran	11.57			13.64	c	c	
2-Methyl-1-Propanol							
1-Butanol	36.3			67.59			
3-Methyl-2-butanol							
2-Pentanol							
3-Methyl-1-butanol							
Dimethyldisulfide							
Ethyl isobuyrate							
2-Hexanone	11.09	116.34	166.48	10.84	166.2	186	
2-Heptanone	111.12	278.8	430.78	103.41	317.3	275	
5-Methyl-3-heptanone							
1-Octen-3-ol							
3-Octanone							29.86
3-Octanol							
2-Pentylfuran	205.83	384.52	500.42	239.71	218.9	229	
2-Octen-1-ol							
3-Methoxy-3-1(methylethyl)							
2-Nonanone							
Fenchone							
Borneol	13.73	13.76	16.42				
Alpha-terpineol	9.54			19.03	8.73	9.48	
Geosmin				8.45			
Thujopsene							

Table G-20: MVOC Target List Emissions from Aspergillus versicolor on Oriented Strand Board (ng)

Test	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Organism	None / Control	None / Control	None / Control	Aspergillus versicolor	Aspergillus versicolor	Aspergillus versicolor	Aspergillus versicolor
MVOC Substrate	OSB	OSB	OSB	OSB	OSB	OSB	CYA
3-Methylfuran	16.3			20.2		c	21.72
2-Methyl-1-Propanol							
1-Butanol	58.8			72.48			
3-Methyl-2-butanol							
2-Pentanol							
3-Methyl-1-butanol							
Dimethyldisulfide							
Ethyl isobuyrate							
2-Hexanone	15.52	111	275	26.84	663	639	
2-Heptanone	256	280	588	388.7	1318	2274	
5-Methyl-3-heptanone							
1-Octen-3-ol							
3-Octanone							
3-Octanol							
2-Pentylfuran	729	663	787	816	1401	1507	
2-Octen-1-ol							
3-Methoxy-3-1(methylethyl)							
2-Nonanone							
Fenchone							
Borneol							
Alpha-terpineol							
Geosmin							
Thujopsene							

Table G-21: MVOC Target List Emissions from Aspergillus versicolor on OSB (Duplicate Experiment) (ng)

Test	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Organism	None / Control	None / Control	None / Control	Aspergillus versicolor	Aspergillus versicolor	Aspergillus versicolor	Aspergillus versicolor
MVOC Substrate	OSB	OSB	OSB	OSB	OSB	OSB	CYA
3-Methylfuran	16.3						21.72
2-Methyl-1-Propanol							
1-Butanol	58.8						
3-Methyl-2-butanol							
2-Pentanol							
3-Methyl-1-butanol							
Dimethyldisulfide							
Ethyl isobuyrate							
2-Hexanone	15.52	111	275				
2-Heptanone	256	280	588				
5-Methyl-3-heptanone							
1-Octen-3-ol							
3-Octanone							
3-Octanol							
2-Pentylfuran	729	663	787				
2-Octen-1-ol							
3-Methoxy-3-1(methylethyl)							
2-Nonanone							
Fenchone							
Borneol							
Alpha-terpineol							
Geosmin							
Thujopsene							

Table G-22: MVOC Target List Emissions from Stachybotrys chartarum on Kraft paper (ng)

Test	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Organism	None / control	None / control	None / control	Stachybotrys chartarum	Stachybotrys chartarum	Stachybotrys chartarum	Stachybotrys chartarum
MVOC Substrate	Kraft paper	Kraft paper	Kraft paper	Kraft paper	Kraft paper	Kraft paper	B-Malt
3-Methylfuran		c	c				193.04
2-Methyl-1-Propanol							
1-Butanol							
3-Methyl-2-butanol							
2-Pentanol							
3-Methyl-1-butanol		37.43	43.82				
Dimethyldisulfide						9.69	9.32
Ethyl isobuyrate							
2-Hexanone		32.34	22.23				
2-Heptanone		75.67	43.83				
5-Methyl-3-heptanone							
1-Octen-3-ol							
3-Octanone							
3-Octanol							
2-Pentylfuran		10.49					
2-Octen-1-ol							
3-Methoxy-3-1(methylethyl)							
2-Nonanone							
Fenchone							
Borneol							
Alpha-terpineol							
Geosmin							
Thujopsene							

Table G-23: MVOC Target List Emissions from Cladosporium sphaerospermum on Kraft paper (ng)

Test	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Organism	None / control	None / control	None / control	Cladosporium sphaerospermum	Cladosporium sphaerospermum	Cladosporium sphaerospermum	Cladosporium sphaerospermum
MVOC Substrate	Kraft paper	Kraft paper	Kraft paper	Kraft paper	Kraft paper	Kraft paper	B-Malt
3-Methylfuran		c	c				
2-Methyl-1-Propanol							
1-Butanol							
3-Methyl-2-butanol							
2-Pentanol							
3-Methyl-1-butanol		37.43	43.82	14.97			
Dimethyldisulfide							
Ethyl isobuyrate							
2-Hexanone		32.34	22.23				
2-Heptanone		75.67	43.83				
5-Methyl-3-heptanone							
1-Octen-3-ol							
3-Octanone							
3-Octanol							
2-Pentylfuran		10.49		5.34	c	c	
2-Octen-1-ol							
3-Methoxy-3-1(methylethyl)							
2-Nonanone							
Fenchone							
Borneol							
Alpha-terpineol							
Geosmin							
Thujopsene							

Table G-24: MVOC Target List Emissions from Aspergillus sydowii on Kraft paper (ng)

Test	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Organism	None / control	None / control	None / control	Aspergillus sydowii	Aspergillus sydowii	Aspergillus sydowii	Aspergillus sydowii
MVOC Substrate	Kraft paper	Kraft paper	Kraft paper	Kraft paper	Kraft paper	Kraft paper	CYA
3-Methylfuran		c	c				29.58
2-Methyl-1-Propanol							
1-Butanol							
3-Methyl-2-butanol							
2-Pentanol							
3-Methyl-1-butanol		37.43	43.82				
Dimethyldisulfide							7.6
Ethyl isobuyrate							
2-Hexanone		32.34	22.23				
2-Heptanone		75.67	43.83				
5-Methyl-3-heptanone							
1-Octen-3-ol							69.55
3-Octanone							
3-Octanol							
2-Pentylfuran		10.49			3.95	3.86	68.96
2-Octen-1-ol							
3-Methoxy-3-1(methylethyl)							
2-Nonanone							
Fenchone							
Borneol							
Alpha-terpineol							
Geosmin							
Thujopsene							48

Table G-25: MVOC Target List Emissions from Eurotium amstelodami on Kraft paper (ng)

Test	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Organism	None / control	None / control	None / control	Eurotium amstelodami	Eurotium amstelodami	Eurotium amstelodami	Eurotium amstelodami
MVOC Substrate	Kraft paper	Kraft paper	Kraft paper	Kraft paper	Kraft paper	Kraft paper	CYA
3-Methylfuran		c	c			c	
2-Methyl-1-Propanol							
1-Butanol							
3-Methyl-2-butanol							
2-Pentanol							
3-Methyl-1-butanol		37.43	43.82			59.57	
Dimethyldisulfide						18.7	2873
Ethyl isobuyrate							
2-Hexanone		32.34	22.23			20.64	
2-Heptanone		75.67	43.83			50.49	29.65
5-Methyl-3-heptanone							
1-Octen-3-ol							144.8
3-Octanone							50.46
3-Octanol							
2-Pentylfuran		10.49			7.87	17.2	87.71
2-Octen-1-ol							
3-Methoxy-3-1(methylethyl)							
2-Nonanone							
Fenchone							
Borneol							
Alpha-terpineol							
Geosmin							
Thujopsene							

Table G-26: MVOC Target List Emissions from Chaetomium globosum on Kraft paper (ng)

Test	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Organism	None / control	None / control	None / control	Chaetomium globosum	Chaetomium globosum	Chaetomium globosum	Chaetomium globosum
MVOC Substrate	Kraft paper	Kraft paper	Kraft paper	Kraft paper	Kraft paper	Kraft paper	Cellulose
3-Methylfuran		c	c				
2-Methyl-1-Propanol							
1-Butanol							
3-Methyl-2-butanol							
2-Pentanol							
3-Methyl-1-butanol		37.43	43.82				
Dimethyldisulfide							
Ethyl isobuyrate							
2-Hexanone		32.34	22.23		18.89	21.89	
2-Heptanone		75.67	43.83	22.17	58.16	58.75	
5-Methyl-3-heptanone							
1-Octen-3-ol							
3-Octanone				40.88	84.16	98.94	29.86
3-Octanol							
2-Pentylfuran		10.49			14.43	13.68	
2-Octen-1-ol							
3-Methoxy-3-1(methylethyl)							
2-Nonanone							
Fenchone							
Borneol							
Alpha-terpineol							
Geosmin							
Thujopsene							

Table G-27: MVOC Target List Emissions from Aspergillus versicolor on Kraft paper (ng)

Test	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Organism	None / control	None / control	None / control	Aspergillus versicolor	Aspergillus versicolor	Aspergillus versicolor	Aspergillus versicolor
MVOC Substrate	Kraft paper	Kraft paper	Kraft paper	Kraft paper	Kraft paper	Kraft paper	CYA
3-Methylfuran							21.72
2-Methyl-1-Propanol							
1-Butanol							
3-Methyl-2-butanol							
2-Pentanol							
3-Methyl-1-butanol							
Dimethyldisulfide	9.72	12.96	15.58	11.04			
Ethyl isobuyrate							
2-Hexanone	9.65	15.31	12.61	7.72			
2-Heptanone	18.08	25.98	40.72				
5-Methyl-3-heptanone							
1-Octen-3-ol							
3-Octanone							
3-Octanol							
2-Pentylfuran	8.46	13.66	10.8	5.91	6.61	6.05	
2-Octen-1-ol							
3-Methoxy-3-1(methylethyl)							
2-Nonanone							
Fenchone							
Borneol							
Alpha-terpineol							
Geosmin							
Thujopsene							

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Table G-28: MVOC Target List Emissions from Aspergillus versicolor on Kraft paper (ng)

Test	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Organism	None / control	None / control	None / control	Aspergillus versicolor	Aspergillus versicolor	Aspergillus versicolor	Aspergillus versicolor
MVOC Substrate	Kraft paper	Kraft paper	Kraft paper	Kraft paper	Kraft paper	Kraft paper	Kraft Paper
3-Methylfuran							21.72
2-Methyl-1-Propanol							
1-Butanol							
3-Methyl-2-butanol							
2-Pentanol							
3-Methyl-1-butanol							
Dimethyldisulfide	9.72	12.96	15.58	11.13	12.88	12.11	
Ethyl isobuyrate							
2-Hexanone	9.65	15.31	12.61				
2-Heptanone	18.08	25.98	40.72				
5-Methyl-3-heptanone							
1-Octen-3-ol							
3-Octanone							
3-Octanol							
2-Pentylfuran	8.46	13.66	10.8	8.66	8.61	9.03	
2-Octen-1-ol							
3-Methoxy-3-1(methylethyl)							
2-Nonanone							
Fenchone							
Borneol							
Alpha-terpineol							
Geosmin							
Thujopsene							

Table G-29: MVOC Target List Emissions from Media (Positive Control) (ng)

Test	Negative controls			Positive controls					
Organism	None			Cladosporium sphaerospermum	Eurotium amstelodami	Chaetomium globosum	Stachybotrys chartarum	Aspergillus sydowii	Aspergillus versicolor
MVOC Substrate	B-Malt	Cellulose	CYA	B-Malt	CYA	Cellulose	B-Malt	CYA	CYA
3-Methylfuran							193.04	29.58	21.72
2-Methyl-1-Propanol									
1-Butanol									
3-Methyl-2-butanol									
2-Pentanol									
3-Methyl-1-butanol									
Dimethyldisulfide					2873		9.32	7.6	
Ethyl isobuyrate									
2-Hexanone									
2-Heptanone					29.65				
5-Methyl-3-heptanone									
1-Octen-3-ol					144.8			69.55	
3-Octanone					50.46	29.86			
3-Octanol									
2-Pentylfuran					87.71			68.96	
2-Octen-1-ol									
3-Methoxy-3-1(methylethyl)									
2-Nonanone									
Fenchone									
Borneol									
Alpha-terpineol									
Geosmin									
Thujopsene	1.57	1.75	2.95					48	

Appendix H
IVOC Results

Table H-1: IVOC Emissions from Stachybotrys chartarum on Drywall (ng)

Substrate	**Drywall**						**B-Malt**
Organism	**None / control**			**Stachybotrys chartarum**			
IVOC	**Week 1**	**Week 2**	**Week 3**	**Week 1**	**Week 2**	**Week 3**	**Positive Control**
1-Dodecene					9.5		
1-Heptanol					22	24.8	
1-Heptene, 2,4-dimethyl	2.7	5.1	9.5	36.4	117.6	165.1	
1-Hexanol (N-Hexyl alcohol)					7.9		
1-Hexanol, 2-ethyl	5.9	3.2	5.6	27.8	120.2	146.1	
1-Octene		0.5	0.6				
1-Pentanol (N-Pentyl alcohol)		0.5			22.8		
1-Undecene		1.9	1.3	9.6	97.5	110.3	
2,2,4-Trimethyl-1,3-pentanediol monoisobutyrate (Texanol	2.8	2.2	1.5		239.8		
2-Heptanone		1.1		7.9	29.4	68.4	
2-Hexanone					13.9		
2-Pentanone				14.2	28.4		
2-Pentanone, 4-methyl (Methyl isobutyl ketone, MIBK)		1.6	0.5	14.9	80.5	3.9	
3-Heptanone		0.7			11.2	25.0	
Acetate, butyl						12.2	
Acetate, ethyl		3.2	2.3		44	47.3	
Acetic acid	1.1	1.1	2.0	40.2	27.6	52.5	291
Acetic acid, 1-methylethyl ester (Isopropyl acetate)						34.9	
Acetophenone (Ethanone, 1-phenyl)	5.6		8.8	8.3	164.2	132.6	
Benzene, 1,2,3-trimethyl							44.8
Benzene, 1-ethyl-4-methyl (4-Ethyltoluene)						14.5	22.5

Substrate	Drywall						B-Malt
Organism	None / control			Stachybotrys chartarum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Benzene, 1-methyl-4-(1-methylethyl) (p-Cymene; 4-Isopropyltoluene)							312
Benzene, methoxy-				98.1	457.7	467.6	10.2
Benzenemethanol, α,α-dimethyl-	3.8		5.8			92.7	
Benzoic acid, 2-hydroxy-, methyl ester	6.7	292.4	4.2	63.3	161.1	472.8	
Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1α,2ß,5α)	0.8	33.5		14.7	31.9	53.3	
Cyclopentasiloxane, decamethyl	1.1	1.4	1.3		61.4	55.3	86.3
Decane		1.0			72.6	93.2	
Decane, 2-methyl		1.1			39.4		
Decane, 3-methyl					70.3	76.1	
Decane, 4-methyl						48.0	
Dodecane	1.6		3.4	19.6	101.1	83.6	
Ethanol	56.2					285.0	
Ethanol, 2-(2-ethoxyethoxy) (Diethylene glycol monoethyl	6.6	16.7	13.1	76.2	172.4	158.9	
Ethanol, 2-(2-methoxyethoxy)		0.5	1.2			26.1	
Ethanol, 2-butoxy		1.4	2.7		0.1	49.0	
Heptane		1.1	0.4		13.2		
Heptane, 2,4-dimethyl		1.0	1.2	10.3	21.6	29.6	
Heptane, 4-methyl	0.8	2.3	2.3	25.2	47.6	70.9	
Limonene (Dipentene; 1-Methyl-4-(1-methylethyl)cyclohexe	0.9	0.8		15.3	83.1	92.5	
Nonane					5.1		
Octane	0.4	0.8	1.0		15.6	22.4	

Substrate	Drywall						B-Malt
Organism	None / control			Stachybotrys chartarum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Octane, 4-methyl (8CI9CI)	0.8	1.5	1.1	13.3	41.7	68.4	
Pentadecane				6.8			
Pinene, α (2,6,6-Trimethyl-bicyclo[3.1.1]hept-2-ene)				83.5	14.6		
Pinene, ß (6,6-Dimethyl-2-methylene-bicyclo[3.1.1]heptan				10.3	26.6	31.4	
Propane, 2-ethoxy-2-methyl						12.9	
Styrene						20.6	164
Toluene (Methylbenzene)	1.4	1.8	2.2	9.9	38.1	46.5	
Tridecane		1.3	1.1	6.6	19	24.4	2.8
Undecane		11.5		23.2	204.2	203.0	45.1
Undecane, 2-methyl					15.3		3
Xylene (para and/or meta)		0.6			8	28.6	100

Table H-2: IVOC Emissions from Cladosporium sphaerospermum on Drywall (ng)

Substrate	Drywall						CYA
Organism	None / control			Cladosporium sphaerospermum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
1-Heptene, 2,4-dimethyl	2.7	5.1	9.5	1.4	6.6	8.3	
1-Hexanol, 2-ethyl	5.9	3.2	5.6	2.6	8.1	9.3	
1-Octene		0.5	0.6		0.3	0.4	
1-Undecene		1.9	1.3		2.9	4.2	
2,2,4-Trimethyl-1,3-pentanediol monoisobutyrate (Texanol	2.8	2.2	1.5	0.5	7.3	4.2	
2,2-Dimethyl-1-isopropyl-1,3-propanediol monoisobutyrate	2.7	3.5	2.8	0.5	4.9	5.9	
2-Hexenal, 2-ethyl-					3.3		
2-Pentanone, 4-methyl (Methyl isobutyl ketone, MIBK)		1.6	0.5		1.1	0.3	
Acetaldehyde	3.2			2.4			
Acetate, butyl							
Acetate, ethyl		3.2	2.3		0.8		
Acetic acid	1.1	1.1	2.0	1.7	1.5	3.3	
Acetone				38.7			
Acetophenone (Ethanone, 1-phenyl) (9CI)	5.6		8.8	4.0			
Benzaldehyde	2.8	3.4	2.2			0.4	
Benzene		0.7	0.7		0.7		
Benzene, 1,2,3-trimethyl					1.8		
Benzene, 1-ethyl-2-methyl (2-Ethyltoluene)					0.5	0.8	
Benzene, 1-ethyl-4-methyl (4-Ethyltoluene)					0.7	1.0	
Benzene, ethyl					0.5	0.6	
Benzenemethanol, α,α-	3.8		5.8		5.9	7.5	

Substrate	Drywall						CYA
Organism	None / control			Cladosporium sphaerospermum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
dimethyl-							
Benzoic acid, 2-hydroxy-, methyl ester	6.7	292.4	4.2		7.5		
Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1α,2ß,5α)-(+	0.8	33.5			0.8		
Cyclopentasiloxane, decamethyl	1.1	1.4	1.3		1.9	2.8	67.3
Decane		1.0			2.1	4.0	
Decane, 2-methyl		1.1			1.3	2.0	
Decane, 3-methyl					2.7	3.6	
Decane, 5,6-dipropyl-		0.4	0.7		1.0	1.1	
Dodecane	1.6		3.4	1.2	3.8	5.5	
Ethanol	56.2			17.8			13.8
Ethanol, 2-(2-ethoxyethoxy) (Diethylene glycol monoethyl	6.6	16.7	13.1	2.5	6.4	14.0	
Heptane		1.1	0.4			0.3	
Heptane, 2,4-dimethyl		1.0	1.2		1.2	1.7	
Heptane, 4-methyl	0.8	2.3	2.3		2.6	3.6	
Hexanal	0.7	2.5	1.1		0.7	0.3	
Limonene (Dipentene; 1-Methyl-4-(1-methylethyl)cyclohexe	0.9	0.8			2.2	2.7	
Methanol	6.7			1.4			
Naphthalene						0.2	
Nonane					0.5	1.3	
Octane	0.4	0.8	1.0		0.9	0.7	
Octane, 4-methyl (8CI9CI)	0.8	1.5	1.1		2.1	2.7	
Pentane, 2,3,4-trimethyl		1.0	1.8		0.6	0.3	

Substrate	Drywall						CYA
Organism	None / control			Cladosporium sphaerospermum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Phenol					0.8		
Styrene					1.1	1.3	7.1
Toluene (Methylbenzene)	1.4	1.8	2.2		2.5	1.9	
Tridecane		1.3	1.1		0.8	1.2	6.2
Undecane		11.5			10.1	11.2	
Xylene (para and/or meta)		0.6			1.0	1.1	
Xylene, ortho					0.6	1.2	

Table H-3: IVOC Emissions from Aspergillus sydowii on Drywall (ng)

Substrate	Drywall						CYA
Organism	None / control			Aspergillus sydowii			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
1-Heptene, 2,4-dimethyl	2.7	5.1	9.5	77.1	150.5	263.5	
1-Hexanol, 2-ethyl	5.9	3.2	5.6	31.6	67.7	110.2	51
1-Nonanol					7.2	11.1	
1-Octene		0.5	0.6			12.3	
1-Undecene		1.9	1.3	15.5	42.6	5.0	
2,2,4-Trimethyl-1,3-pentanediol monoisobutyrate (Texanol	2.8	2.2	1.5	28.5	136.5	127.5	
2-Heptanone		1.1			14.3	13.4	
2-Hexanone					15.9	23.3	
2-Pentanol, 2-methyl					10.8		
2-Pentanone					56.1	25.0	
2-Pentanone, 4-methyl (Methyl isobutyl ketone, MIBK)		1.6	0.5		54.5	18.1	
3-Heptanone		0.7				11.1	
Acetate, ethyl		3.2	2.3			14.1	
Acetic acid	1.1	1.1	2.0	26.3	12.6	41.8	386
Acetophenone (Ethanone, 1-phenyl) (9CI)	5.6		8.8			77.4	
Benzene, 1-ethyl-4-methyl (4-Ethyltoluene)						13.8	
Benzene, 1-methoxy-4-(1-propenyl)				51.0	59.3	86.1	
Benzenemethanol, α,α-dimethyl-	3.8		5.8			70.3	
Benzoic acid, 2-hydroxy-, methyl ester	6.7	292.4	4.2	4783.0	4437.1	6296.4	
Benzothiazole		1.2		4.2			

Substrate	Drywall						CYA
Organism	None / control			Aspergillus sydowii			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1α,2ß,5α)-(+	0.8	33.5		1247.6	479.7	1521.9	
Cyclopentasiloxane, decamethyl	1.1	1.4	1.3		32.5	52.1	38.5
Decane		1.0		15.3	35.3	62.8	
Decane, 2-methyl		1.1				7.5	
Decane, 3-methyl					30.6	56.0	
Decane, 4-methyl					19.8	31.7	
Ethanol, 2-(2-ethoxyethoxy) (Diethylene glycol monoethyl	6.6	16.7	13.1	60.3	151.9	353.3	
Ethanol, 2-(2-methoxyethoxy)		0.5	1.2			35.9	
Heptane		1.1	0.4		11.9		
Heptane, 2,4-dimethyl		1.0	1.2	8.1	20.1	43.8	
Heptane, 4-methyl	0.8	2.3	2.3	23.0	69.1	118.0	
Hexanal	0.7	2.5	1.1		10.4		
Limonene (Dipentene; 1-Methyl-4-(1-methylethyl)cyclohexe	0.9	0.8		17.7	31.8	47.7	
Nonane						2.4	
Octane	0.4	0.8	1.0	7.6	16.2	21.2	
Octane, 2-methyl			1.0		13.5	29.6	
Octane, 4-methyl (8CI9CI)	0.8	1.5	1.1	11.6	28.0	44.0	
Pinene, α (2,6,6-Trimethyl-bicyclo[3.1.1]hept-2-ene)					33.0		
Styrene					5.0	13.8	80.6
Toluene (Methylbenzene)	1.4	1.8	2.2	11.7	66.7	88.6	
Tridecane		1.3	1.1		33.1	13.7	
Undecane		11.5		100.0	193.8	166.1	
Xylene (para and/or meta)		0.6			7.4	11.7	

Substrate	Drywall						CYA
Organism	None / control			Aspergillus sydowii			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Xylene, ortho						16.7	

Table H-4: IVOC Emissions from Eurotium amstelodami on Drywall (ng)

Substrate	Drywall						CYA
Organism	None / control			Eurotium amstelodami			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
1-Heptene, 2,4-dimethyl	2.7	5.1	9.5	3.1	16.9	16.4	
1-Hexanol, 2-ethyl	5.9	3.2	5.6	2.4	13.8	13.4	52.9
1-Octene		0.5	0.6		0.6	0.6	
1-Undecene		1.9	1.3	0.6	3.0	6.3	
2,2,4-Trimethyl-1,3-pentanediol monoisobutyrate (Texanol	2.8	2.2	1.5		1.9	2.4	
2,2-Dimethyl-1-isopropyl-1,3-propanediol monoisobutyrate	2.7	3.5	2.8			1.9	
2-Heptanone		1.1			3.0	1.9	37
2-Hexanone					0.7	0.6	
2-Hexenal, 2-ethyl-				0.7	3.5	5.6	
2-Pentanone					1.2	1.7	
2-Pentanone, 4-methyl (Methyl isobutyl ketone, MIBK)		1.6	0.5		6.7	5.3	
Acetaldehyde	3.2			6.2			
Acetate, ethyl		3.2	2.3		1.9	0.5	
Acetic acid	1.1	1.1	2.0		2.9	0.1	121
Benzaldehyde	2.8	3.4	2.2		1.0	0.6	
Benzene		0.7	0.7		1.2		
Benzene, 1,2,3-trimethyl					3.7	2.4	
Benzene, 1,3,5-trimethyl (Mesitylene)					0.3		
Benzene, 1-ethyl-2-methyl (2-Ethyltoluene)					1.3	1.0	
Benzene, 1-ethyl-4-methyl (4-Ethyltoluene)					2.2	2.2	
Benzene, ethyl					1.2		

Substrate	Drywall						CYA
Organism	None / control			Eurotium amstelodami			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Benzenemethanol, α,α-dimethyl-	3.8		5.8		6.2	8.7	
Benzoic acid, 2-hydroxy-, methyl ester	6.7	292.4	4.2	1.9	43.4	55.5	
Benzothiazole		1.2			0.8	1.0	
Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1α,2ß,5α)-(+	0.8	33.5			8.1	8.2	
Cyclopentasiloxane, decamethyl	1.1	1.4	1.3		3.9	4.3	
Cyclotrisiloxane, hexamethyl					0.3		
Decane		1.0		0.7	5.5	3.7	
Decane, 2-methyl		1.1			2.7		
Decane, 3-methyl					5.7		
Decane, 5,6-dipropyl-		0.4	0.7		1.4	1.4	
Dodecane	1.6		3.4	1.5	6.2	7.3	
Ethanol	56.2			51.3			216
Ethanol, 2-(2-ethoxyethoxy) (Diethylene glycol monoethyl	6.6	16.7	13.1	1.4	10.0	16.3	
Ethanol, 2-(2-methoxyethoxy)		0.5	1.2			0.5	
Heptane		1.1	0.4		1.8	0.9	
Heptane, 2,4-dimethyl		1.0	1.2		3.2	3.3	
Heptane, 4-methyl	0.8	2.3	2.3	0.4	7.8	7.7	
Hexanal	0.7	2.5	1.1		1.2	0.4	
Limonene (Dipentene; 1-Methyl-4-(1-methylethyl)cyclohexe	0.9	0.8			3.9	2.6	
Methanol	6.7			3.9			
Nonane					1.8	1.3	
Octane	0.4	0.8	1.0		1.6	1.1	
Octane, 4-methyl (8CI9CI)	0.8	1.5	1.1	0.5	5.1	3.6	

Substrate	Drywall						CYA
Organism	None / control			Eurotium amstelodami			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Pentanal					0.2		
Pentane, 2,3,4-trimethyl		1.0	1.8		0.9	2.1	
Styrene					4.1	2.3	73.1
Toluene (Methylbenzene)	1.4	1.8	2.2	1.9	4.8	4.1	
Tridecane		1.3	1.1		1.2	1.5	15.1
Undecane		11.5		3.3	17.9	18.5	
Undecane, 2,6-dimethyl						0.6	
Xylene (para and/or meta)		0.6			2.8	1.5	28.6
Xylene, ortho					2.1	4.2	

Table H-5: IVOC Emissions from Chaetomium globosum on Drywall (ng)

Substrate	Drywall						CYA
Organism	None / control			Chaetomium globosum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
1-Heptene			0.3		0.6		
1-Heptene, 2,4-dimethyl	2.7	5.1	9.5	1.8	14.8	39.7	
1-Hexanol, 2-ethyl	5.9	3.2	5.6	1.6	8.2	18.8	60.1
1-Octene		0.5	0.6			1.0	
1-Pentanol (N-Pentyl alcohol)		0.5				2.7	
1-Undecene		1.9	1.3		7.4	6.4	
2,2,4-Trimethyl-1,3-pentanediol monoisobutyrate (Texanol	2.8	2.2	1.5	1.3	2.4	5.9	
2-Heptanone		1.1			9.9	9.9	
2-Hexanone						2.0	
2-Pentanone						2.9	
2-Pentanone, 4-methyl (Methyl isobutyl ketone, MIBK)		1.6	0.5		0.2	11.9	
3-Heptanone		0.7			3.7	3.7	
3-Octanone					6.7	14.3	29.9
Acetaldehyde	3.2			3.2			
Acetate, butyl						0.9	
Acetate, ethyl		3.2	2.3		2.5	3.9	
Acetic acid	1.1	1.1	2.0	0.4		0.5	6.1
Acetic acid, 1-methylethyl ester (Isopropyl acetate)						2.2	
Acetophenone (Ethanone, 1-phenyl) (9CI)	5.6		8.8	2.0	4.2	9.2	
Benzaldehyde	2.8	3.4	2.2			1.5	
Benzene, 1,2,3-trimethyl						4.8	
Benzene, 1,3,5-trimethyl (Mesitylene)						0.7	

Substrate	Drywall						CYA
Organism	None / control			Chaetomium globosum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Benzene, 1-ethyl-4-methyl (4-Ethyltoluene)						3.0	
Benzene, ethyl					1.3	1.5	
Benzene, methoxy-							
Benzenemethanol, α,α-dimethyl-	3.8		5.8		6.6	8.8	
Benzoic acid, 2-hydroxy-, methyl ester	6.7	292.4	4.2		85.5	54.3	
Benzothiazole		1.2				1.2	
Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1α,2ß,5α)-(+	0.8	33.5			12.6	12.2	
Cyclopentasiloxane, decamethyl	1.1	1.4	1.3		4.3	7.7	52.8
Cyclotetrasiloxane, octamethyl						1.6	
Cyclotrisiloxane, hexamethyl					1.6		
Decane		1.0			7.5	9.0	11.8
Decane, 2-methyl		1.1			4.0	4.8	
Decane, 3-methyl					6.3	8.5	
Decane, 5,6-dipropyl-		0.4	0.7		2.6	2.0	
Dodecane	1.6		3.4	0.9	7.7	10.6	6.9
Ethanol, 2-(2-ethoxyethoxy) (Diethylene glycol monoethyl	6.6	16.7	13.1	2.2	16.3	20.4	
Ethanol, 2-(2-methoxyethoxy)		0.5	1.2			1.8	
Ethanol, 2-butoxy		1.4	2.7			1.5	
Heptane		1.1	0.4			1.4	
Heptane, 2,4-dimethyl		1.0	1.2		3.6	6.4	
Heptane, 4-methyl	0.8	2.3	2.3	1.6	3.4	17.9	
Hexanal	0.7	2.5	1.1			1.4	

Substrate	Drywall						CYA
Organism	**None / control**			**Chaetomium globosum**			
IVOC	**Week 1**	**Week 2**	**Week 3**	**Week 1**	**Week 2**	**Week 3**	**Positive Control**
Hexane, 2,3,5-trimethyl (8CI9CI)			1.0			0.5	
Hexane, 3-ethyl					0.3		
Limonene (Dipentene; 1-Methyl-4-(1-methylethyl)cyclohexe	0.9	0.8			7.3	4.7	
Methanol	6.7			2.5			
Octane	0.4	0.8	1.0		0.3	1.9	
Octane, 2-methyl			1.0				
Octane, 4-methyl (8CI9CI)	0.8	1.5	1.1		4.3	10.9	
Pentane, 2,3,4-trimethyl		1.0	1.8			1.5	
Pinene, α (2,6,6-Trimethyl-bicyclo[3.1.1]hept-2-ene)						0.9	
Styrene					4.4	2.7	
Tetradecane				1.1	6.0	8.4	
Toluene (Methylbenzene)	1.4	1.8	2.2		1.2	7.4	
Tridecane		1.3	1.1		3.9	2.0	
Undecane		11.5			9.8	18.1	10.5
Undecane, 2-methyl					0.8		
Xylene (para and/or meta)		0.6			5.2	4.1	100
Xylene, ortho					5.6	2.8	

Table H-6: IVOC Emissions from Aspergillus versicolor on Drywall (ng)

Substrate	Drywall						CYA
Organism	None / control			Aspergillus versicolor			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
1-Heptene, 2,4-dimethyl	23.6	127.6	165.7	23.7	68.1	203.3	
1-Hexanol, 2-ethyl	77.5	51.6	77.9	78.1	59.8	58.9	
1-Undecene	14.9	41.2	41.7	30.7	57.1	71.7	
2,2,4-Trimethyl-1,3-pentanediol monoisobutyrate (Texanol				10.4			
2-Heptanone	27.0	17.0	38.4	15.8	7.9	12.8	
2-Hexenal, 2-ethyl-	25.9			39.6			
2-Pentanone				1.6			
2-Pentanone, 4-methyl (Methyl isobutyl ketone, MIBK)				23.6	16.8	23.1	
3-Heptanone	10.6			7.8	3.7		
Acetate, ethyl	17.9	156.1	92.1	8.8	0.8	1.1	
Acetic acid	38.4	47.3	23.7	7.9		7.8	144
Acetophenone (Ethanone, 1-phenyl) (9CI)		34.6	30.9	10.0	16.0	48.8	
Benzaldehyde	36.3	42.7	52.3	10.9	8.6		
Benzene, 1-ethyl-4-methyl (4-Ethyltoluene)	9.5		8.2	7.3			
Benzene, 1-methyl-4-(1-methylethyl) (p-Cymene; 4-Isoprop				13.4			
Benzene, ethyl			19.5				
Benzenemethanol, α,α-dimethyl-	34.9	41.6	28.5	22.2		46.0	
Benzothiazole						4.0	
Butanal, 3-methyl				13.6	12.5	4.7	
Cyclopentasiloxane, decamethyl	11.5	20.9	11.8	20.1	24.2	34.3	

Substrate	**Drywall**						**CYA**
Organism	**None / control**			**Aspergillus versicolor**			
IVOC	**Week 1**	**Week 2**	**Week 3**	**Week 1**	**Week 2**	**Week 3**	**Positive Control**
Decane	29.0	35.5	38.8	39.8	46.3	37.8	
Decane, 2-methyl			15.3		14.7	14.6	
Decane, 3-methyl	8.3	24.9	32.1	35.8	46.7	52.9	
Decane, 5,6-dipropyl-	11.4			11.1	14.9	47.0	
Disulfide, dimethyl				23.0	9.9	16.6	
Dodecane	28.2	31.8	46.9	22.2	33.2	47.8	
Ethanol	502.8	2244.5	1160.8	220.4	573.7	675.6	
Ethanol, 2-(2-ethoxyethoxy) (Diethylene glycol monoethyl	38.1	142.9	157.5	22.7	89.1	156.2	
Ethanol, 2-(2-methoxyethoxy)	43.2	145.9	133.0		72.0	89.1	
Ethanol, 2-butoxy	32.9	82.1	64.9	13.0	9.7	18.7	
Heptanal (Heptaldehyde)	70.1	28.2	67.4	10.7			
Heptane						10.5	
Heptane, 2,4-dimethyl	6.1	17.1	26.2	6.0	14.7	36.8	
Heptane, 4-methyl	25.3	40.2	46.2	17.4	37.0	93.8	
Hexanal	143.0	59.9	87.3	21.3	16.0	20.3	
Nonane	11.1	8.9		7.5	5.0	14.1	
Octane				4.7	7.3	12.9	
Octane, 2-methyl			30.1			8.7	
Octane, 4-methyl (8CI9CI)		25.9	44.4	13.1	21.4	50.1	
Pinene, α (2,6,6-Trimethyl-bicyclo[3.1.1]hept-2-ene)	26.3			20.5			
Styrene				15.5			
Toluene (Methylbenzene)	20.5	21.1	23.1	25.4	22.9	36.2	
Tridecane	15.6	11.5		9.1	11.8	14.1	
Undecane	54.7	69.8	58.7	49.5	78.4	110.5	
Xylene (para and/or meta)	10.6			6.6			

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Table H-7: IVOC Emissions from Aspergillus versicolor on Drywall (Duplicate Experiment) (ng)

Substrate	Drywall						CYA
Organism	None / control			Aspergillus versicolor			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
1-Heptene, 2,4-dimethyl	23.6	127.6	165.7	18.3	113.5	149.8	
1-Hexanol, 2-ethyl	77.5	51.6	77.9	57.1	110	135.5	
1-Undecene	14.9	41.2	41.7	11.7	78.5	116.4	
2-Heptanone	27	17	38.4	4.4		22.5	
2-Hexenal, 2-ethyl-	25.9				47.5		
2-Pentanone, 4-methyl (Methyl isobutyl ketone, MIBK)				11.9			
2-Propanone, 1-hydroxy	32.6		12	15.7			
3-Heptanone	10.6			3.1		16.1	
Acetate, ethyl	17.9	156.1	92.1	35.7	36.6	69.4	
Acetic acid	38.4	47.3	23.7	18.3	47.3	31.8	144
Acetophenone (Ethanone, 1-phenyl) (9CI)		34.6	30.9	0.7	45.5	72.6	
Benzene						6.5	
Benzene, 1-ethyl-4-methyl (4-Ethyltoluene)	9.5		8.2			12.8	
Benzenemethanol, α,α-dimethyl-	34.9	41.6	28.5	1.3	42.7	67.5	
Cyclopentasiloxane, decamethyl	11.5	20.9	11.8	6.8	29.7	40.1	
Decane	29	35.5	38.8	15.5		80	
Decane, 2-methyl			15.3		24.1	34.7	
Decane, 5,6-dipropyl-	11.4			7.6	7.4	118.4	
Disulfide, dimethyl				12			
Dodecane	28.2	31.8	46.9	16.9	65.5	56.2	
Ethanol	502.8	2244.5	1160.8	1124.8	1931	3564.2	

Substrate	Drywall						CYA
Organism	None / control			Aspergillus versicolor			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Ethanol, 2-(2-ethoxyethoxy) (Diethylene glycol monoethyl ether)	38.1	142.9	157.5	42.9	182.1	118.2	
Ethanol, 2-(2-methoxyethoxy)	43.2	145.9	133	5.3	223.4	119.5	
Ethanol, 2-butoxy	32.9	82.1	64.9		118	44.6	
Heptane, 2,4-dimethyl	6.1	17.1	26.2		17.8	18.5	
Heptane, 4-methyl	25.3	40.2	46.2	8.2	53.3	60.6	
Hexanal	143	59.9	87.3	12.9	16	15.4	
Nonane	11.1	8.9				22	
Octane					6.1	2.8	
Octane, 1-chloro				14.5	51.8	85.2	
Octane, 2-methyl			30.1			20	
Octane, 4-methyl (8CI9CI)		25.9	44.4	9.1	34.1	39.6	
Pinene, α (2,6,6-Trimethyl-bicyclo[3.1.1]hept-2-ene)	26.3				174.4	11.1	
Pinene, ß (6,6-Dimethyl-2-methylene-bicyclo[3.1.1]heptane)					79.6		
Styrene					18.8	40.6	
Toluene (Methylbenzene)	20.5	21.1	23.1	15.3	31.5	51.2	
Tridecane	15.6	11.5			24.3	19.7	
Undecane	54.7	69.8	58.7	21.3	155.4	128.7	
Xylene (para and/or meta)	10.6				24.3	18.9	

Table H-8: IVOC Emissions from Stachybotrys chartarum on Ceiling tile (ng)

Substrate	Ceiling tile						CYA
Organism	None / control			Stachybotrys chartarum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
1-Butanol, 3-methyl						14.9	
1-Dodecanol					323.5	224.2	
1-Heptene, 2,4-dimethyl	3.7	7.0	16.6	61.8	252.2	171.6	
1-Hexanol (N-Hexyl alcohol)						4.2	
1-Hexanol, 2-ethyl	4.8	4.8	13.1	15.1	169.7	126.7	
1-Pentanol (N-Pentyl alcohol)			6.0		82.0		
1-Tridecene						8.1	
1-Undecene	1.9	1.6	14.1	30.0	214.0	164.4	
2-Heptanone			1.7		19.6		
2-Hexanone			2.3		31.3	13.2	
2-Pentanone			0.8		29.5		
2-Pentanone, 4-methyl (Methyl isobutyl ketone, MIBK)					5.8		
3-Heptanone		0.7	3.5		47.7	9	
3-Hexanone (Ethyl propyl ketone)						24.2	
3-Octanone					47.7		
Acetate, ethyl		2.6	10.0		126.7	80.3	
Acetic acid	1.7	0.7	3.4		25.3	43.5	291
Acetic acid, 1-methylethyl ester (Isopropyl acetate)				9.2	30.3	20.1	
Acetophenone (Ethanone, 1-phenyl) (9CI)			7.2	27.0		137.1	
Benzaldehyde	3.0	7.1	13.1		48.0	24.2	
Benzene, 1-ethyl-4-methyl (4-Ethyltoluene)			1.5		19.5		22.5

Substrate	Ceiling tile						CYA
Organism	None / control			Stachybotrys chartarum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Benzene, 1-methoxy-4-(1-propenyl)				11.4	99.4		
Benzene, methoxy-				42.3	112.7	112.3	10.2
Benzenemethanol, α,α-dimethyl-	3.1	3.6				102.8	
Benzoic acid, 2-hydroxy-, methyl ester		5.4	4.7	1110.7	6373.0	524.7	
Benzothiazole		0.7	1.2			17.4	
Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1α,2ß,5α)-(+				148.1	1849.7		
Cyclopentasiloxane, decamethyl	2.1	4.5	18.5	45.9	322.0	286.9	86.3
Cyclotetrasiloxane, octamethyl			5.4	14.2	48.9	43.5	
Cyclotrisiloxane, hexamethyl		2.4	6.6		87.5	41	
Decane, 2-methyl		0.2		5.3	62.2	37.8	
Decane, 3-methyl		1.0	4.1	23.4	168.9	9.6	
Decane, 4-methyl		1.1				70.2	
Dodecane	2.6	11.1	28.2	102.8	330.4	574	
Ethanol				48.2	355.3	1190	
Ethanol, 2-(2-ethoxyethoxy) (Diethylene glycol monoethyl	5.7	10.6	16.3	24.4	132.6	110.6	
Furan, 2-pentyl	1.6	1.4	7.9		115.5	57.3	
Heptane					41.6		
Heptane, 2,4-dimethyl	0.7	0.7	3.0	12.6	56.7	32.4	
Heptane, 3-methylene (9CI)		0.5			43.5		
Heptane, 4-methyl	0.7	2.3	7.4	33.5	96.6	87.1	
Hexanal	13.0	27.5	135.8		20.7		
Nonane			1.1		18.2		
Octane					31.1	16	

Substrate	Ceiling tile						CYA
Organism	None / control			Stachybotrys chartarum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Octane, 2-methyl					32.3	14.7	
Octane, 4-methyl (8CI9CI)	0.8	1.2	5.9	12.6	140.7	66	
Pentadecane				271.5	354.9	85.1	
Propane, 2-ethoxy-2-methyl					20.7	17.1	
Styrene					13.1		164
Toluene (Methylbenzene)	0.8	1.0	3.3	10.5	70.0	27.7	
Tridecane		1.2	2.8	25.9	58.1	59.9	2.8
Undecane	4.8	9.1	14.9	33.1	498.3	240.9	45.1
Undecane, 2,6-dimethyl		2.1	6.3	19.3		147.7	
Undecane, 2-methyl		1.0	7.9	24.0	84.6	88.6	3
Undecane, 3-methyl		0.7	7.9	17.8	122.4	121.9	
Undecane, 4-methyl		0.5			35.1	38.8	
Xylene (para and/or meta)	0.5		2.4		34.4	2.3	100

Table H-9: IVOC Emissions from Cladosporium sphaerospermum on Ceiling tile (ng)

Substrate	Ceiling tile						CYA
Organism	None / control			Cladosporium sphaerospermum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
1-Heptene, 2,4-dimethyl	3.7	7.0	16.6	2.5	11.1	26.5	
1-Hexanol, 2-ethyl	4.8	4.8	13.1	2.2	6.5	13.3	
1-Undecene	1.9	1.6	14.1	1.7	5.1	16.9	
2,2,4-Trimethyl-1,3-pentanediol monoisobutyrate (Texanol	0.8	2.1	2.0	0.6	1.3	9.6	
2,2-Dimethyl-1-isopropyl-1,3-propanediol monoisobutyrate	1.2	3.8	2.8	1.3	2.0	8.1	
2-n-Butyl furan						0.6	
Acetaldehyde				1.2			
Acetic acid	1.7	0.7	3.4		1.4	1.2	
Acetone				7.1			
Acetophenone (Ethanone, 1-phenyl) (9CI)			7.2			7.9	
Benzaldehyde	3.0	7.1	13.1	0.7	1.8	3.5	
Benzene, 1,2,3-trimethyl						2.2	
Benzene, 1-ethyl-2-methyl (2-Ethyltoluene)						0.8	
Benzene, 1-ethyl-4-methyl (4-Ethyltoluene)			1.5			0.8	
Benzene, 1-methoxy-4-(1-propenyl)				1.1			
Benzenemethanol, α,α-dimethyl-	3.1	3.6		2.5	5.8	12.0	
Benzoic acid, 2-hydroxy-, methyl ester		5.4	4.7	95.4	36.5	18.8	
Benzothiazole		0.7	1.2		0.7	0.6	

Substrate	Ceiling tile						CYA
Organism	None / control			Cladosporium sphaerospermum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1α,2ß,5α)-(+				25.7	5.9		
Cyclopentasiloxane, decamethyl	2.1	4.5	18.5	2.4	10.4	28.6	67.3
Cyclotetrasiloxane, octamethyl			5.4		1.2	3.6	
Cyclotrisiloxane, hexamethyl		2.4	6.6			4.3	
Decane, 2,6-dimethyl			4.6		2.6	7.2	
Decane, 2-methyl		0.2			1.6	5.0	
Decane, 3-methyl		1.0	4.1		3.9	11.7	
Decane, 5,6-dipropyl-		0.6	1.1		1.0	1.5	
Dodecane	2.6	11.1	28.2		14.2	47.0	
Dodecane, 4,6-dimethyl (9CI)			1.9			3.4	
Ethanol				6.8			13.8
Ethanol, 2-(2-ethoxyethoxy) (Diethylene glycol monoethyl	5.7	10.6	16.3	2.2	12.9	14.3	
Ethanol, 2-(2-methoxyethoxy)		0.6			1.3		
Furan, 2-pentyl	1.6	1.4	7.9	1.1	2.0	7.5	
Heptane					0.6	1.4	
Heptane, 2,4-dimethyl	0.7	0.7	3.0		1.9	4.3	
Heptane, 3-methylene (9CI)		0.5			1.0	1.6	
Heptane, 4-methyl	0.7	2.3	7.4	0.6	6.9	13.2	
Hexanal	13.0	27.5	135.8	0.4	1.6	2.7	
Methanol	10.2			1.2			
Nonane			1.1			0.8	
Octane					0.7	1.4	
Octane, 2,4,6-trimethyl						7.1	
Octane, 4-methyl (8CI9CI)	0.8	1.2	5.9	0.6	2.4	5.8	

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Substrate	**Ceiling tile**						**CYA**
Organism	**None / control**			**Cladosporium sphaerospermum**			
IVOC	**Week 1**	**Week 2**	**Week 3**	**Week 1**	**Week 2**	**Week 3**	**Positive Control**
Pentane, 2,3,4-trimethyl		1.1	1.1		1.4		
Styrene						0.7	7.1
Toluene (Methylbenzene)	0.8	1.0	3.3	1.5	3.2	5.5	
Tridecane		1.2	2.8		1.6	4.8	6.2
Undecane	4.8	9.1	14.9	3.9	12.5	18.7	
Undecane, 2,6-dimethyl		2.1	6.3		3.7	10.0	
Undecane, 2-methyl		1.0	7.9	0.5	3.0	7.7	9.1
Undecane, 3-methyl		0.7	7.9		3.2	7.2	
Undecane, 4-methyl		0.5			1.2	3.2	
Xylene (para and/or meta)	0.5		2.4		0.6	2.1	
Xylene, ortho			0.6			0.7	

Table H-10: IVOC Emissions from Aspergillus sydowii on Ceiling tile (ng)

Substrate	**Ceiling tile**						**CYA**
Organism	**None / control**			**Aspergillus sydowii**			
IVOC	**Week 1**	**Week 2**	**Week 3**	**Week 1**	**Week 2**	**Week 3**	**Positive Control**
1-Decene				9.6	35.2	1.0	
1-Heptanol				16.7			
1-Heptene					5.4		
1-Heptene, 2,4-dimethyl	3.7	7.0	16.6	61.9	654.5	163.5	
1-Hexanol, 2-ethyl	4.8	4.8	13.1	106.8	176.6	245.2	
1-Octen-3-ol					**29.0**	**5.9**	**54.1**
1-Pentene, 2-methyl				26.5			
1-Undecene	1.9	1.6	14.1	110.9	177.3	98.2	
2,2,4-Trimethyl-1,3-pentanediol monoisobutyrate (Texanol	0.8	2.1	2.0	27.3		197.2	
3-Heptanone		0.7	3.5	6.7	21.2	5.7	
3-Hexanone (Ethyl propyl ketone)					20.6		
Acetic acid	1.7	0.7	3.4		10.0	15.7	386
Benzene, 1-methoxy-4-(1-propenyl)					65.0		
Benzene, ethyl				5.6			
Benzoic acid, 2-hydroxy-, methyl ester		5.4	4.7	90.3	4406.4	207.3	
Cyclohexane, methyl					7.1		
Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1α,2ß,5α)-(+					803.3		
Cyclopentasiloxane, decamethyl	2.1	4.5	18.5	125.6	272.7	228.9	38.5
Cyclotetrasiloxane, octamethyl			5.4	9.6	301.9	123.2	
Cyclotrisiloxane, hexamethyl		2.4	6.6		60.7	43.4	
Decane				26.3	485.9	237.1	

Substrate	Ceiling tile						CYA
Organism	None / control			Aspergillus sydowii			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Decane, 2,6-dimethyl			4.6			73.2	
Decane, 2-methyl		0.2		33.0	47.7	26.9	
Decane, 3-methyl		1.0	4.1	96.3	151.1	68.4	
Dodecane	2.6	11.1	28.2	125.6	254.3	341.3	
Ethanol, 2-(2-ethoxyethoxy) (Diethylene glycol monoethyl	5.7	10.6	16.3	36.1	182.3	155.5	
Furan, 2-ethyl					4.0		
Furan, 2-pentyl	1.6	1.4	7.9	40.7	920.6	3.7	221
Heptane					31.0	5.2	
Heptane, 2,4-dimethyl	0.7	0.7	3.0	8.8	27.4	24.1	
Heptane, 3-methylene (9CI)		0.5				16.2	
Heptane, 4-methyl	0.7	2.3	7.4	25.4	93.7	112.4	
Hexanal	13.0	27.5	135.8	8.2	16.3		
Nonane			1.1	12.1	7.4		
Nonane, 3,7-dimethyl				67.6			
Octane				9.0	17.0	7.9	
Octane, 2,4,6-trimethyl						39.3	
Octane, 2-methyl						6.9	
Octane, 4-methyl (8CI9CI)	0.8	1.2	5.9	12.0	34.4	20.3	
Propane, 2-ethoxy-2-methyl					15.8	13.4	
Tetradecane						99.0	
Toluene (Methylbenzene)	0.8	1.0	3.3	17.3	44.5	42.5	
Tridecane		1.2	2.8	6.0	62.6	47.2	
Undecane	4.8	9.1	14.9	238.7	984.2	371.3	
Undecane, 2,6-dimethyl		2.1	6.3	24.8	102.1	82.7	
Undecane, 2-methyl		1.0	7.9		81.5	85.3	
Undecane, 3-methyl		0.7	7.9		122.3	96.4	

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Substrate	Ceiling tile						CYA
Organism	None / control			Aspergillus sydowii			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Xylene (para and/or meta)	0.5		2.4		15.0		

Table H-11: IVOC Emissions from Eurotium amstelodami on Ceiling tile (ng)

Substrate	Ceiling tile						CYA
Organism	None / control			Eurotium amstelodami			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
1-Heptene, 2,4-dimethyl	3.7	7.0	16.6	1.5	19.1	29.4	
1-Hexanol, 2-ethyl	4.8	4.8	13.1		21.8	39.2	52.9
1-Pentanol (N-Pentyl alcohol)			6.0		10.4	8.9	
1-Undecene	1.9	1.6	14.1		22.5	23.5	
2,2,4-Trimethyl-1,3-pentanediol monoisobutyrate (Texanol	0.8	2.1	2.0		3.2	5.0	
2,2-Dimethyl-1-isopropyl-1,3-propanediol monoisobutyrate	1.2	3.8	2.8		3.0	7.5	
2-Heptanone			1.7		2.5	3.3	37
2-Hexanone			2.3		2.6	3.1	
2-Hexenal, 2-ethyl-						16.8	
2-Pentanone			0.8			2.6	
2-Pentanone, 4-methyl (Methyl isobutyl ketone, MIBK)						1.2	
2-n-Butylacrolein		1.7	7.8		6.6	7.3	
3-Heptanone		0.7	3.5		5.0	6.5	
Acetaldehyde				2.2			
Acetate, ethyl		2.6	10.0		6.6	10.7	
Acetic acid	1.7	0.7	3.4	0.2		1.4	121
Acetophenone (Ethanone, 1-phenyl) (9CI)			7.2	0.7	8.9		
Benzaldehyde	3.0	7.1	13.1	0.7	10.3	9.7	
Benzene					1.5	1.6	
Benzene, 1-ethyl-4-methyl (4-Ethyltoluene)			1.5		3.6	3.0	
Benzene, 1-methoxy-4-(1-propenyl)					7.4	1.8	

Substrate	Ceiling tile						CYA
Organism	None / control			Eurotium amstelodami			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Benzenemethanol, α,α-dimethyl-	3.1	3.6			14.6		
Benzoic acid, 2-hydroxy-, methyl ester		5.4	4.7	2.4	349.9	27.0	
Benzothiazole		0.7	1.2			2.1	
Butanal, 3-methyl					2.1	1.8	
Cyclohexane, methyl					0.3		
Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1α,2ß,5α)-(+					72.3	6.9	
Cyclopentasiloxane, decamethyl	2.1	4.5	18.5		28.2	28.8	
Cyclotetrasiloxane, octamethyl			5.4		6.3	10.3	
Cyclotrisiloxane, hexamethyl		2.4	6.6		6.7	10.1	
Decane, 2,6-dimethyl			4.6		7.9		
Decane, 2-methyl		0.2			6.7	7.0	
Decane, 3-methyl		1.0	4.1		17.4	18.9	
Decane, 5,6-dipropyl-		0.6	1.1		1.2	1.5	
Dodecane	2.6	11.1	28.2	2.0	27.2	25.7	
Ethanol, 2-(2-ethoxyethoxy) (Diethylene glycol monoethyl	5.7	10.6	16.3	3.5	26.6	30.8	
Ethanol, 2-(2-methoxyethoxy)		0.6			3.5		
Furan, 2-ethyl					0.4		
Furan, 2-pentyl	1.6	1.4	7.9		13.6	12.9	278
Heptanal (Heptaldehyde)		0.2	4.9		3.7	3.4	
Heptane, 2,4-dimethyl	0.7	0.7	3.0		3.0	4.9	
Heptane, 3-methylene (9CI)		0.5			3.5		
Heptane, 4-methyl	0.7	2.3	7.4	0.8	11.4	13.8	
Hexanal	13.0	27.5	135.8	1.5	51.1	54.7	

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Substrate	Ceiling tile						CYA
Organism	None / control			Eurotium amstelodami			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Methanol	10.2			2.0			
Nonane			1.1		1.5	2.1	
Octane					1.8		
Octane, 2,4,6-trimethyl						13.2	
Octane, 4-methyl (8CI9CI)	0.8	1.2	5.9		18.6	21.3	
Pentanal	0.9	7.4	23.6		5.2	8.4	
Pentane, 2,3,4-trimethyl		1.1	1.1			1.7	
Styrene					1.4	2.0	73.1
Toluene (Methylbenzene)	0.8	1.0	3.3		7.5	5.8	
Tridecane		1.2	2.8		3.9	3.1	15.1
Undecane	4.8	9.1	14.9	1.7	21.3	32.3	
Undecane, 2,6-dimethyl		2.1	6.3		13.2	6.6	
Undecane, 2-methyl		1.0	7.9		6.8	6.1	10.1
Undecane, 3-methyl		0.7	7.9		11.7	10.6	
Undecane, 4-methyl		0.5			3.4	2.7	
Xylene (para and/or meta)	0.5		2.4		3.5	5.3	28.6
Xylene, ortho			0.6		1.5	1.5	

Table H-12: IVOC Emissions from Chaetomium globosum on Ceiling tile (ng)

Substrate	Ceiling tile						CYA
Organism	None / control			Chaetomium globosum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
1-Heptene, 2,4-dimethyl	3.7	7.0	16.6	0.4	21.5	30.5	
1-Hexanol (N-Hexyl alcohol)					3.0		
1-Hexanol, 2-ethyl	4.8	4.8	13.1	6.9	14.7	35.7	60.1
1-Octen-3-ol				1.0	2.7	4.1	
1-Pentanol (N-Pentyl alcohol)			6.0	2.5	11.3	4.2	
1-Undecene	1.9	1.6	14.1	0.3	13.6	24.2	
2,2,4-Trimethyl-1,3-pentanediol monoisobutyrate (Texanol	0.8	2.1	2.0		0.5		
2,2-Dimethyl-1-isopropyl-1,3-propanediol monoisobutyrate	1.2	3.8	2.8		0.6		
2-Heptanone			1.7	0.2	2.2	3.2	
2-Hexanone			2.3	0.3	2.6	3.9	
2-Hexenal, 2-ethyl-				1.6	7.5		
2-Pentanone			0.8		1.6	1.5	
3-Cyclohepten-1-one					2.9	4.9	
3-Heptanone		0.7	3.5	0.7	4.8	6.2	
3-Octanone				5.7	11.9	27.1	29.9
Acetate, ethyl		2.6	10.0	1.8	8.6	10.3	
Acetic acid	1.7	0.7	3.4	1.2	2.0	5.1	6.1
Acetophenone (Ethanone, 1-phenyl) (9CI)			7.2	3.2	8.8		
Benzaldehyde	3.0	7.1	13.1	1.0	4.7	7.0	
Benzene, 1-methoxy-4-(1-propenyl)						4.8	
Benzene, methoxy-					1.1	3.1	
Benzenemethanol, α,α-dimethyl-	3.1	3.6			9.2		

Substrate	Ceiling tile						CYA
Organism	None / control			Chaetomium globosum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Benzoic acid, 2-hydroxy-, methyl ester		5.4	4.7	5.3	12.5	438.3	
Cyclohexane, methyl					0.8		
Cyclohexanol						1.7	
Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1α,2ß,5α)-(+				1.8	2.7	145.1	
Cyclopentasiloxane, decamethyl	2.1	4.5	18.5		13.0	37.2	52.8
Cyclotetrasiloxane, octamethyl			5.4		4.3	6.5	
Cyclotrisiloxane, hexamethyl		2.4	6.6		9.9	12.2	
Decane					3.3		11.8
Decane, 2,6-dimethyl			4.6		2.7	13.9	
Decane, 2-methyl		0.2		0.4	4.0		
Decane, 3-methyl		1.0	4.1	0.9	11.5		
Decane, 5,6-dipropyl-		0.6	1.1	0.4	0.5		
Dodecane	2.6	11.1	28.2	4.0	8.3	42.5	6.9
Ethanol, 2-(2-ethoxyethoxy) (Diethylene glycol monoethyl	5.7	10.6	16.3	3.6	13.3		
Ethanol, 2-(2-methoxyethoxy)		0.6		0.4	5.1		
Furan, 2-pentyl	1.6	1.4	7.9	2.7	9.1	21.1	
Heptanal (Heptaldehyde)		0.2	4.9		1.5		
Heptane					4.6		
Heptane, 2,4-dimethyl	0.7	0.7	3.0		3.6	5.4	
Heptane, 3-methylene (9CI)		0.5			5.9	3.7	
Heptane, 4-methyl	0.7	2.3	7.4		11.7	13.4	
Hexanal	13.0	27.5	135.8	0.5	13.2	12.7	
Hexane, 2,3,5-trimethyl (8CI9CI)						0.9	

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Substrate	Ceiling tile						CYA
Organism	None / control			Chaetomium globosum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Nonane			1.1		1.6	1.9	
Octane					3.9	4.2	
Octane, 2-methyl					4.2		
Octane, 3-methyl					1.2		
Octane, 4-methyl (8CI9CI)	0.8	1.2	5.9	4.5	12.3	20.9	
Pentane, 2,3,4-trimethyl		1.1	1.1			1.9	
Styrene					1.3	2.8	
Toluene (Methylbenzene)	0.8	1.0	3.3	0.4	6.5	7.4	
Tridecane		1.2	2.8	0.5	0.8	5.5	
Undecane	4.8	9.1	14.9	3.3	12.1	38.8	10.5
Undecane, 2,6-dimethyl		2.1	6.3	0.7	1.3	19.9	
Undecane, 2-methyl		1.0	7.9	0.8	1.9	9.1	
Undecane, 3-methyl		0.7	7.9			15.3	
Undecane, 4-methyl		0.5				5.1	
Undecane, 5-methyl (8CI9CI)						10.6	
Xylene (para and/or meta)	0.5		2.4	0.2	3.6	4.9	42.6
Xylene, ortho			0.6		1.3	2.2	19.7

Table H-13: IVOC Emissions from Aspergillus versicolor on Ceiling tile

Substrate	Ceiling tile						CYA
Organism	None / control			Aspergillus versicolor			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
1-Dodecanol						269.4	
1-Heptene, 2,4-dimethyl	50.1	135.4	219.2	60.3	170.9	318.9	
1-Hexanol, 2-ethyl	62.8	128.7	227.2	51.0	137.3	232.4	
1-Pentanol (N-Pentyl alcohol)	13.6	22.6	20.0	13.0			
1-Undecene	50.4	129.3	171.2	28.1	196.6	246.7	
2-Hexanone				13.6	7.0		
2-Pentanone				2.4			
2-Pentanone, 4-methyl (Methyl isobutyl ketone, MIBK)				4.1	14.3		
2-n-Butyl furan		21.2		23.0	10.3	30.8	
2-n-Butylacrolein	111.7	143.3	174.3	77.2	55.9	78.7	
3-Heptanone	4.8	12.0	8.5	10.2	4.3	21.1	
3-Hexanone (Ethyl propyl ketone)				8.0			
5-Dodecene, (Z)- (8CI9CI)					67.0	122.3	
6-Dodecene, (E)				34.8	129.0	126.2	
Acetate, ethyl	36.2	45.8	86.1		15.7	21.3	
Acetic acid	20.8	49.8	11.5			24.8	144
Benzaldehyde	57.7	152.6	243.5	31.2	39.0	81.5	
Benzene				10.3			
Benzene, 1-ethyl-4-methyl (4-Ethyltoluene)				5.4	12.0		
Butanal, 3-methyl					14.5	10.4	
Cyclohexanone						81.4	
Cyclopentasiloxane, decamethyl	38.2	101.1	104.5	24.1	103.6	183.6	
Cyclotetrasiloxane, octamethyl	15.2		65.8	14.3	42.4	56.5	

Substrate	Ceiling tile						CYA
Organism	None / control			Aspergillus versicolor			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Cyclotrisiloxane, hexamethyl			45.3	23.5		64.9	
Decane, 2-methyl	5.0	37.7	41.3	3.5	8.6	54.0	
Decane, 3-methyl	15.7	70.6	40.5		95.3	114.3	
Decane, 4-methyl	4.1	45.0	25.7		143.5	79.2	
Decane, 5,6-dipropyl-		7.6			76.5		
Dodecane	28.6	74.4	114.7	19.5	74.8	141.9	
Ethanol	1144.4	1123.6	1459.8	200.3	1123.0	737.9	
Ethanol, 2-(2-ethoxyethoxy) (Diethylene glycol monoethyl	61.4	187.2	151.7	34.6	213.4	311.7	
Ethanol, 2-(2-methoxyethoxy)	26.2	82.9	138.4	28.4	122.7	142.3	
Ethanol, 2-butoxy		24.1	35.4	4.2	30.3	33.3	
Furan, 2-ethyl				21.7	12.7	8.7	
Furan, 2-pentyl	94.0	181.3	165.7	137.2	349.9	514.7	
Heptane, 2,4-dimethyl	5.5	15.7	28.6		26.3	58.1	
Heptane, 4-methyl	38.0	65.6	120.4	38.4	103.9	120.4	
Hexanal	566.1	483.4	695.8	134.6	68.1	64.9	
Nonane				9.2	3.2	26.4	
Octane				9.9	10.3	13.9	
Octane, 4-methyl (8CI9CI)	14.8	32.5	46.8	35.1	45.1	85.6	
Pentadecane			80.3			168.6	
Pentanal	55.7	42.1	62.3	37.1			
Propane, 2-ethoxy-2-methyl			14.1		13.4	15.3	
Styrene				10.5	7.0	40.6	
Tetradecane				6.8			
Toluene (Methylbenzene)	18.6	23.9	28.5	29.9	24.8	53.8	
Tridecane	10.5	11.1	16.2	12.9	17.6	35.6	
Undecane	57.7	129.9	157.0	30.5	144.0	192.3	
Undecane, 2,4-dimethyl				10.9			

Substrate	**Ceiling tile**						**CYA**
Organism	**None / control**			**Aspergillus versicolor**			
IVOC	**Week 1**	**Week 2**	**Week 3**	**Week 1**	**Week 2**	**Week 3**	**Positive Control**
Undecane, 2,6-dimethyl		8.1	11.7		11.4	39.0	
Undecane, 2-methyl		23.2	9.6		29.1	51.3	
Undecane, 3-methyl		20.4	9.0		24.2	54.2	
Xylene (para and/or meta)				11.0		14.7	

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Table H-14: IVOC Emissions from Aspergillus versicolor on Ceiling tile (Duplicate Experiment) (ng)

Substrate	Ceiling tile						CYA
Organism	None / control			Aspergillus versicolor			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
1-Dodecanol						60.6	
1-Heptene, 2,4-dimethyl	50.1	135.4	219.2	17.4	156	71	
1-Hexanol, 2-ethyl	62.8	128.7	227.2	38.1	315.9	1992.3	
1-Pentanol (N-Pentyl alcohol)	13.6	22.6	20				
1-Undecene	50.4	129.3	171.2	9	441	2298.4	
2,2,4-Trimethyl-1,3-pentanediol monoisobutyrate (Texanol)						96.3	
2,2-Dimethyl-1-isopropyl-1,3-propanediol monoisobutyrate (Texanol)						37.5	
2-Butanol, 2,3-dimethyl-						50.9	
2-Heptanone	12.4		15.4		20		
2-Hexanone				8			
2-Hexenal, 2-ethyl-			105.8			967	
2-n-Butyl furan		21.2		16.3		13.9	
2-n-Butylacrolein	111.7	143.3	174.3	40.9		13.8	
3-Heptanone	4.8	12	8.5	6.8	13.2		
5-Dodecene, (Z)- (8CI9CI)					195.5	986.1	
6-Dodecene, (E)				2.2	243.1	169.3	
Acetate, ethyl	36.2	45.8	86.1		10.2		
Benzaldehyde	57.7	152.6	243.5	16.2	100.1		
Benzene					4.6	12.6	
Benzene, 1-ethyl-2-methyl (2-Ethyltoluene)						451.6	
Benzene, 1-ethyl-4-methyl (4-Ethyltoluene)				4.9		55.9	
Butanal, 3-methyl				10.3			

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Supersedes AQS Report #: 09478-08

Substrate	Ceiling tile						CYA
Organism	**None / control**			**Aspergillus versicolor**			
IVOC	**Week 1**	**Week 2**	**Week 3**	**Week 1**	**Week 2**	**Week 3**	**Positive Control**
Chloroform (Trichloromethane)						17.6	
Cyclopentasiloxane, decamethyl	38.2	101.1	104.5		363.4	965.8	
Cyclotetrasiloxane, octamethyl	15.2		65.8	10.3	109.9	567.5	
Cyclotrisiloxane, hexamethyl			45.3	11.2	64.1	69.5	
Decane, 2-methyl	5	37.7	41.3		122.6	760	
Decane, 3-methyl	15.7	70.6	40.5		223.2	534.7	
Decane, 4-methyl	4.1	45	25.7		173.2	240.8	
Decane, 5,6-dipropyl-		7.6			11.3		
Dodecane	28.6	74.4	114.7	12.9	225.9	1034.7	
Ethanol	1144.4	1123.6	1459.8	133.9	566		
Ethanol, 2-(2-ethoxyethoxy) (Diethylene glycol monoethyl ether)	61.4	187.2	151.7	53.9	239		
Ethanol, 2-(2-methoxyethoxy)	26.2	82.9	138.4	37	66.1		
Ethanol, 2-butoxy		24.1	35.4		37	107.9	
Furan, 2-ethyl				6.7	12.4	24.1	
Furan, 2-methyl-					5.8	6.6	
Furan, 2-pentyl	94	181.3	165.7	135.3	450.8	3238.8	
Furan, 3-methyl						7	
Heptane					16.4	12.7	
Heptane, 2,4-dimethyl	5.5	15.7	28.6		64.1	17.5	
Heptane, 4-methyl	38	65.6	120.4	25.9	26.6	66.7	
Hexanal	566.1	483.4	695.8	95.5	166.6		
Naphthalene						52.8	
Nonane				8.9	20.8	176.8	
Octane				6.5		5.3	
Octane, 4-methyl (8CI9CI)	14.8	32.5	46.8	18.7	67.8	15.2	

Substrate	Ceiling tile						CYA
Organism	None / control			Aspergillus versicolor			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Pentadecane			80.3		14.9		
Propane, 2-ethoxy-2-methyl			14.1		18.4		
Styrene				19.4	25.9	26.8	
Toluene (Methylbenzene)	18.6	23.9	28.5	15.1	27.9	21.4	
Tridecane	10.5	11.1	16.2		24	90.8	
Tridecanol						21.6	
Undecane	57.7	129.9	157	10.9	365	1185.6	
Undecane, 2,6-dimethyl		8.1	11.7		56.8	330.9	
Undecane, 2-methyl		23.2	9.6		92.6	453.6	
Undecane, 3-methyl		20.4	9		82.1		
Xylene (para and/or meta)				9.2		3.6	

Table H-15: IVOC Emissions from Stachybotrys chartarum on Oriented Strand Board (ng)

Substrate	OSB						B-Malt
Organism	None / control			Stachybotrys chartarum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
(+)-Camphene	9.2	41.3	92.2	749.9	1496.2	1463.9	
1,4-Cyclohexadiene, 1-methyl-4-(1-methylethyl)- (9CI)				123.5	210.8	230.1	150.7
1-Heptene, 2,4-dimethyl		12.5	26.9	213.1	345.2	297.9	
1-Hexanol, 2-ethyl	7.3	7.2	12.2	193	295.2		
1-Nonene				22.8			
1-Octene			4.5	25.2			
1-Pentanol (N-Pentyl alcohol)	1.9	10.6	46.5	669.4	367.2	112	
2,2,4-Trimethyl-1,3-pentanediol monoisobutyrate (Texano	3	2.4	4.9		267	232.3	
2,2-Dimethyl-1-isopropyl-1,3-propanediol monoisobutyrat		3.8	6.6		180.4		
2,6-Dimethyl-1,3,5,7-octatetraene, E					372.4		
2-Heptanone	6.1	15.4	27.3	392.7	470.7	665.4	
2-Hexanone		5.6	11.3	152.7	130.6	250.1	
2-Pentanol, 2-methyl		0.8				11.6	
2-Pentanone	0.6	4.6	9.3	286.7	168.2	194.8	
2-Pentanone, 4-methyl (Methyl isobutyl ketone, MIBK)		5.3	7.2	199.6	148.3	39.9	
2-n-Butylacrolein		10.4	20.4	232.2	304.9	326.9	
3-Cyclopentene-1-acetaldehyde, 2,2,3-trimethyl-					172.8	231.3	
Acetate, ethyl	0.8	6.9	15.7	180.6		168	
Acetic acid	31.9	94	109.7	341.1	625		291
Acetic acid, pentyl ester			4.4			76.2	
Benzaldehyde	4.6	12	20.2	159.7	420.8	616	

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Substrate	OSB						B-Malt
Organism	None / control			Stachybotrys chartarum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Benzaldehyde, 2-hydroxy		2.6	6.2		98.8	309	
Benzene			18.7		157.2	307	
Benzene, 1-methoxy-4-(1-propenyl)		3.4				126.9	
Benzene, chloro	0.8	3.9	9.8	105.2	106	121.1	
Benzene, ethyl				65.5	81.4	107.5	
Benzofuran, 2-methyl					50	78	
Benzoic acid, 2-hydroxy-, methyl ester	7.3	254.4		71.7	1314.5	5400.8	
Bicyclo[2.2.1]heptane, 7,7-dimethyl-2-methylene- (9CI)				230.5		539.9	
Bicyclo[3.1.0]hex-2-ene, 4-methylene-1-(1-methylethyl)-	19.2	27.3		844.3	1108.3	1969.6	
Bicyclo[3.1.0]hexane, 4-methylene-1-(1-methylethyl)					227.9		
Bicyclo[3.1.1]hept-3-en-2-one, 4,6,6-trimethyl-	1	2.9	2.9	29.7	139.4	215.5	
Bicyclo[3.1.1]heptan-3-ol, 6,6-dimethyl-2-methylene-						188.9	
Bicyclo[3.1.1]heptan-3-ol, 6,6-dimethyl-2-methylene-, [					141.1		
Bicyclo[3.3.1]heptan-3-one, 6,6-dimethyl-2-methylene				47.1	173.4		
Butanal, 2-methyl-				414.5			
Butanal, 3-methyl		4.6	7.7	174.6	72.4	112.1	
Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1α,2ß,5α)-(	2	35.3	4		253.5	1558.4	

Substrate	OSB						B-Malt
Organism	**None / control**			**Stachybotrys chartarum**			
IVOC	**Week 1**	**Week 2**	**Week 3**	**Week 1**	**Week 2**	**Week 3**	**Positive Control**
Cyclohexasiloxane, dodecamethyl					113	67.7	
Cyclohexene, 1-methyl-4-(1-methylethylidene)				142.9	240.1	905.6	
Cyclopentasiloxane, decamethyl	2.9	3.7	6.2	75.6	194.3	229.3	86.3
Dodecane	4.3	6.2	7.8	101.8	252.7		
Estragole (4-Allylanisole)	3.1	4	8.4	68.1	295.7	678	
Ethanol	255.9			1649.7	232.2	2275.7	
Ethanol, 2-(2-ethoxyethoxy) (Diethylene glycol monoethy	7.1	13.3	29.1		672.9	794.8	
Fenchol, exo-	1.2	0.6	1.2	21.6	71.9	75	
Formic acid, 2-methylpropyl ester				10			
Formic acid, pentyl ester (8CI9CI)			7	66.5			
Furan, 2-ethyl						50.2	
Furan, 2-methyl-		0.5	0.6			4.9	19
Furan, 3-methyl				9.8			20
Heptanal (Heptaldehyde)	5.1	10.9	17.5	217.4	231.9	287.2	
Heptane				1467.1	1019.1	693.3	
Heptane, 2,4-dimethyl		2.3	6.1	42.9	58.3	123	
Heptane, 4-methyl		10.6	25.4	201	176.4	50.2	
Hexanal	8.1	170.1	218	2191.8	1892.6	2870.5	
Limonene (Dipentene; 1-Methyl-4-(1-methylethyl)cyclohex	27.4	39.1	67.5	1673.2	3776.1	5004.9	
Nonyl aldehyde (Nonanal)	7.6	11.2	14.9	165.3	385.2	561.5	
Octanal	8	10.7	15.4	335.1		538.2	

Substrate	OSB						B-Malt
Organism	None / control			Stachybotrys chartarum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Octane	0.4	11.4	32.3	565.4	440.4	1306.1	
Octane, 4-methyl (8Cl9Cl)	4.2	3.9	8.3	71	77.7	85	
Pentadecane					29.9		
Pentanoic acid (Valeric acid)	1.2	4.7	6.6			92	
Pinene, α (2,6,6-Trimethyl-bicyclo[3.1.1]hept-2-ene)	90.7	349.3	420.3	5019.5	7639.7	7780.3	
Pinene, ß (6,6-Dimethyl-2-methylene-bicyclo[3.1.1]hepta	60	107.6	170.3	2850.1	4136.7	4569.7	
Styrene					78.5		164
Toluene (Methylbenzene)	0.7	12.1	32	474.1	377.5	279.1	
Tricyclo[2.2.1.02,6]heptane, 1,7,7-trimethyl-	1.6	6	11.6	232.8	323.4	327.2	
Tridecane	0.5	1.3	1.3	10.1			2.8
Undecane	5.3	8.5	13	178.4	404.7		45.1
Xylene (para and/or meta)	1.6	3.4	7.1		44		100

Table H-16: IVOC Emissions from Cladosporium sphaerospermum on Oriented Strand Board (ng)

Substrate	OSB						B-Malt
Organism	None / control			Cladosporium sphaerospermum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
(+)-Camphene	9.2	41.3	92.2	17.7	65.7	243.8	
1-Butanol, 3-methyl						76.5	
1-Heptene, 2,4-dimethyl		12.5	26.9	2	8.7	25	
1-Hexanol, 2-ethyl	7.3	7.2	12.2	4.9	16.3	30.5	
1-Nonene					2.6	4	
1-Octene			4.5			8	
1-Pentanol (N-Pentyl alcohol)	1.9	10.6	46.5	7.9	47.5		
2,2,4-Trimethyl-1,3-pentanediol monoisobutyrate (Texano	3	2.4	4.9	2.1	2.7	3.1	
2,2-Dimethyl-1-isopropyl-1,3-propanediol monoisobutyrat		3.8	6.6		0.2	3.9	
2-Heptanone	6.1	15.4	27.3	4.8	33.5	65.1	
2-Hexanone		5.6	11.3	1.5	14.5	24.1	
2-Pentanol, 2-methyl		0.8					
2-Pentanone	0.6	4.6	9.3	3.4	14.2	48.2	
2-Pentanone, 4-methyl (Methyl isobutyl ketone, MIBK)		5.3	7.2	2.2		39.8	
2-Propanone, 1-hydroxy					5.6		
2-n-Butylacrolein		10.4	20.4	2.2	18.9	43.8	
Acetaldehyde				3.9			
Acetate, ethyl	0.8	6.9	15.7	1	9.3	32.6	
Acetic acid	31.9	94	109.7	14	100.2	125.2	
Acetic acid, 1-methylethyl ester (Isopropyl acetate)						43.7	
Acetic acid, pentyl ester			4.4		3.8		
Acetone	32			39.2			

Substrate	OSB						B-Malt
Organism	None / control			Cladosporium sphaerospermum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Acetophenone (Ethanone, 1-phenyl) (9CI)	3.2		7.3		6.9	49.5	
Benzaldehyde	4.6	12	20.2	2.8	16.9	32.2	
Benzaldehyde, 2-hydroxy		2.6	6.2		4.6	7.2	
Benzene, 1-methyl-4-(1-methylethyl) (p-Cymene; 4-Isopro					3.4		
Benzene, chloro	0.8	3.9	9.8	1	10.6	23.6	
Benzenemethanol, α,α-dimethyl-	2.7			1	4.1	6.5	
Benzoic acid, 2-hydroxy-, methyl ester	7.3	254.4			4.5	11.7	
Bicyclo[3.1.0]hex-2-ene, 4-methylene-1-(1-methylethyl)-	19.2	27.3			36.9		
Bicyclo[3.1.1]hept-3-en-2-one, 4,6,6-trimethyl-	1	2.9	2.9	1.3	2.5	9.7	
Bicyclo[3.1.1]heptan-3-ol, 6,6-dimethyl-2-methylene-					3.6	10	
Bicyclo[3.3.1]heptan-3-one, 6,6-dimethyl-2-methylene				1.3	4	11.5	
Butanal, 3-methyl		4.6	7.7	0.9	7.9		
Cyclopentasiloxane, decamethyl	2.9	3.7	6.2	1.1	5.9	11.1	67.3
Decane, 5,6-dipropyl-		1.3	1.2		1.5	1.6	
Dodecane	4.3	6.2	7.8	2.6	8.7	20.6	
Estragole (4-Allylanisole)	3.1	4	8.4	1.1	6.7	14	
Ethanol	255.9			141.9			13.8
Ethanol, 2-(2-ethoxyethoxy) (Diethylene glycol monoethy	7.1	13.3	29.1	5.5	13.4	41.6	

Substrate	OSB						B-Malt
Organism	None / control			Cladosporium sphaerospermum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Fenchol, exo-	1.2	0.6	1.2			2.6	
Formic acid (Methanoic acid)		3.6		1.5	6.6		
Formic acid, pentyl ester (8CI9CI)			7			13.8	
Furan, 2-ethyl					4		
Furan, 2-methyl-		0.5	0.6				
Heptanal (Heptaldehyde)	5.1	10.9	17.5	2.2	15.9	27.1	
Heptane				19.8	1.3	183.6	
Heptane, 2,4-dimethyl		2.3	6.1		3.5		
Heptane, 4-methyl		10.6	25.4		13.8	26.3	
Hexanal	8.1	170.1	218	30.8	207	255.8	
Hexanoic acid	6.6	0.4	34.4	7.1	22.8		
Limonene (Dipentene; 1-Methyl-4-(1-methylethyl)cyclohex	27.4	39.1	67.5	20.2	123.9	272.2	
Methanol	34.6			13.4			
Nonyl aldehyde (Nonanal)	7.6	11.2	14.9	2.3	10.2	18.2	
Octanal	8	10.7	15.4		12		
Octane	0.4	11.4	32.3	6.7	55	115.8	
Octane, 4-methyl (8CI9CI)	4.2	3.9	8.3	0.8	4.7	8	
Pentanal	4.3	29.1	48.2		51	13.2	
Pentane, 2,3,4-trimethyl					2.5	4.6	
Pentanoic acid (Valeric acid)	1.2	4.7	6.6		7.8	9.5	
Pinene, α (2,6,6-Trimethyl-bicyclo[3.1.1]hept-2-ene)	90.7	349.3	420.3	90.6	482.5	555.1	
Pinene, ß (6,6-Dimethyl-2-methylene-bicyclo[3.1.1]hepta	60	107.6	170.3	37.5	207.4	341.3	
Toluene (Methylbenzene)	0.7	12.1	32	6.1	41.6	99.4	

Substrate	OSB						B-Malt
Organism	None / control			Cladosporium sphaerospermum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Tricyclo[2.2.1.02,6]heptane, 1,7,7-trimethyl-	1.6	6	11.6	3	16.1	41.3	
Tridecane	0.5	1.3	1.3		1.2		
Undecane	5.3	8.5	13	6.2	13.8	6.8	6.2
Xylene (para and/or meta)	1.6	3.4	7.1	0.5	6.1	11.5	

Table H-17: IVOC Emissions from Aspergillus sydowii on Oriented Strand Board (ng)

Substrate	**OSB**						**B-Malt**
Organism	**None / control**			**Aspergillus sydowii**			
IVOC	**Week 1**	**Week 2**	**Week 3**	**Week 1**	**Week 2**	**Week 3**	**Positive Control**
(+)-Camphene	9.2	41.3	92.2	95.9	318	1604.2	
1,4-Cyclohexadiene, 1-methyl-4-(1-methylethyl)- (9CI)						128.9	
1-Dodecene						105.7	
1-Heptene, 2,4-dimethyl		12.5	26.9	46.9	90.5	68.2	
1-Hexanol (N-Hexyl alcohol)						87.7	
1-Hexanol, 2-ethyl	7.3	7.2	12.2	124.8	110.6	173.2	51
1-Pentanol (N-Pentyl alcohol)	1.9	10.6	46.5	190.1	385.9	459.6	
1-Undecene	0.8	1.3	2.6	27.9		72.4	
2,6-Dimethyl-1,3,5,7-octatetraene, E				97.9	139.9	181.9	
2-Heptanone	6.1	15.4	27.3	89.9	459.7	928.2	
2-Hexanone		5.6	11.3	50.6	370.3	673	
2-Pentanone	0.6	4.6	9.3	282.7	3072.7	7881	
2-Pentanone, 4-methyl (Methyl isobutyl ketone, MIBK)		5.3	7.2	38.4	109.3	200.7	
2-Propenal, 2-methyl				8.1			
2-n-Butylacrolein		10.4	20.4	44	127		
Acetate, ethyl	0.8	6.9	15.7	35.4	220.1	106.9	
Acetate, methyl (Acetic acid, methyl ester)				27.1			
Acetic acid	31.9	94	109.7	240.1	261.7	744.3	386
Benzaldehyde	4.6	12	20.2	76.7	266.6	453.2	
Benzaldehyde, 2-hydroxy		2.6	6.2		79.5	117.4	
Benzene			18.7			18.4	

Substrate	OSB						B-Malt
Organism	**None / control**			**Aspergillus sydowii**			
Benzene, 1-methoxy-4-(1-propenyl)		3.4			88.1	195.3	
Benzene, chloro	0.8	3.9	9.8	19.5	186.8	108.2	
Benzene, ethyl				12.6			
Benzofuran, 2-methyl						52.3	
Benzoic acid, 2-hydroxy-, methyl ester	7.3	254.4		275.7	5573.3	7206.5	
Bicyclo[3.1.0]hex-2-ene, 4-methylene-1-(1-methylethyl)-	19.2	27.3		454.2	634		
Bicyclo[3.1.0]hexan-3-ol, 4-methyl-1-(1-methylethyl)						4.1	
Bicyclo[3.1.1]hept-3-en-2-one, 4,6,6-trimethyl-	1	2.9	2.9		115	196.6	
Butanal, 2-methyl-				155.6			
Butanal, 3-methyl		4.6	7.7	65.2	41.9		
Butanoic acid						12.1	
Cyclohexanol, 1-methyl-4-(1-methylethenyl)-						49.5	
Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1α,2ß,5α)-(	2	35.3	4	118.8	1310.3	3090.1	
Cyclopentasiloxane, decamethyl	2.9	3.7	6.2	47.2	96.4	148.9	38.5
Decane, 3-methyl					78.2		
Decane, 4-methyl					46.3		
Dodecane	4.3	6.2	7.8		189	272.5	
Estragole (4-Allylanisole)	3.1	4	8.4	58.5	166.1	416.8	
Ethanol	255.9				584.8	2043.3	
Ethanol, 2-(2-ethoxyethoxy) (Diethylene glycol monoethy	7.1	13.3	29.1	155		426.3	
Ethanol, 2-(2-methoxyethoxy)					284.7		

Substrate	OSB						B-Malt
Organism	None / control			Aspergillus sydowii			
Fenchol, exo-	1.2	0.6	1.2	13.4	11.2	25.9	
Heptanal (Heptaldehyde)	5.1	10.9	17.5	39.2	97.2	55.7	
Heptane					81	657.2	
Heptane, 2,4-dimethyl		2.3	6.1	6.7	30		
Heptane, 4-methyl		10.6	25.4	50.2	64.8	59.5	
Hexanal	8.1	170.1	218	863.1	1298.5	629.3	
Hexanoic acid	6.6	0.4	34.4		315	340.6	
Limonene (Dipentene; 1-Methyl-4-(1-methylethyl)cyclohex	27.4	39.1	67.5	643.6	1050.7	1998.9	
Nonyl aldehyde (Nonanal)	7.6	11.2	14.9	111.8	184.7	329.8	
Octane	0.4	11.4	32.3	101.3	260.3	221.7	
Octane, 4-methyl (8CI9CI)	4.2	3.9	8.3	22.3			
Pentanal	4.3	29.1	48.2	573.5	640.6		
Pentanoic acid (Valeric acid)	1.2	4.7	6.6			88.1	
Pinene, α (2,6,6-Trimethyl-bicyclo[3.1.1]hept-2-ene)	90.7	349.3	420.3	3366.9	6973.6	7493.1	
Pinene, ß (6,6-Dimethyl-2-methylene-bicyclo[3.1.1]hepta	60	107.6	170.3	1091.6	1769.2	2509.3	
Propanal, 2-methyl (Isobutanal)				18.6			
Toluene (Methylbenzene)	0.7	12.1	32	108.2	356.2	284.7	
Tricyclo[2.2.1.02,6]heptane, 1,7,7-trimethyl-	1.6	6	11.6	48	208.5	135.9	
Tridecane	0.5	1.3	1.3		30.9	42.8	
Undecane	5.3	8.5	13	184.6		535.2	
Xylene (para and/or meta)	1.6	3.4	7.1		35.1	44.8	

Table H-18: IVOC Emissions from Eurotium amstelodami on Oriented Strand Board (ng)

Substrate	OSB						B-Malt
Organism	None / control			Eurotium amstelodami			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
(+)-Camphene	9.2	41.3	92.2	18	167.7	318.5	
1-Heptene, 2,4-dimethyl		12.5	26.9	1	15.7	29.3	
1-Hexanol, 2-ethyl	7.3	7.2	12.2	3.2		37.8	52.9
1-Nonene					5		
1-Pentanol (N-Pentyl alcohol)	1.9	10.6	46.5	8.4	24.3	32.9	
1-Undecene	0.8	1.3	2.6		4.9	9.1	
2,2,4-Trimethyl-1,3-pentanediol monoisobutyrate (Texano	3	2.4	4.9	3.7	4.4	22.1	
2-Butanone (Methyl ethyl ketone, MEK)	0.6					0.1	
2-Heptanone	6.1	15.4	27.3	7.5	130.7	308	37
2-Hexanone		5.6	11.3	3.3	113	284.1	
2-Pentanone	0.6	4.6	9.3	21.8	255.4	601.2	
2-Pentanone, 4-methyl (Methyl isobutyl ketone, MIBK)		5.3	7.2	2.1	2.6	14.3	
2-n-Butylacrolein		10.4	20.4	2.9	24.5	23.8	
Acetaldehyde				5.7			
Acetate, ethyl	0.8	6.9	15.7	0.8	12.3	19.2	
Acetic acid	31.9	94	109.7	0.8	27.1		121
Acetic acid, pentyl ester			4.4		9.6		
Acetone	32			31.7			
Acetophenone (Ethanone, 1-phenyl) (9CI)	3.2		7.3	1.9			
Benzaldehyde	4.6	12	20.2	2.9	25.5	32.2	
Benzaldehyde, 2-hydroxy		2.6	6.2		7.4	10.7	
Benzene			18.7	4.3			

Substrate	OSB						B-Malt
Organism	None / control			Eurotium amstelodami			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Benzene, 1,2,3-trimethyl				3.4	20		
Benzene, 1-methoxy-4-(1-propenyl)		3.4		1.1			
Benzene, 1-methyl-4-(1-methylethyl) (p-Cymene; 4-Isopro					5	8.4	411
Benzene, chloro	0.8	3.9	9.8	1.2	15.7	29.2	
Benzoic acid, 2-hydroxy-, methyl ester	7.3	254.4		63.3	20.5	22.4	
Benzothiazole	0.8	1.2	1.8		1.8	2.3	
Bicyclo[2.2.1]heptane, 7,7-dimethyl-2-methylene- (9CI)				4.5	33.5	54.4	
Bicyclo[3.1.1]hept-3-en-2-one, 4,6,6-trimethyl-	1	2.9	2.9		2.7	4.9	
Bicyclo[3.1.1]heptan-3-ol, 6,6-dimethyl-2-methylene-					4.8	8.6	
Bicyclo[3.3.1]heptan-3-one, 6,6-dimethyl-2-methylene					4.8	8.8	
Butanal, 3-methyl		4.6	7.7	1.8	8	5.8	
Butane				1.3			
Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1α,2ß,5α)-(	2	35.3	4	21.1	5.8	6.6	
Cyclohexene, 1-methyl-4-(1-methylethylidene)					10.2	21.7	
Cyclopentasiloxane, decamethyl	2.9	3.7	6.2	1.2	9	16.6	
Decane, 5,6-dipropyl-		1.3	1.2		1.4	1.1	
Dodecane	4.3	6.2	7.8	2.3	10.3	16.9	

Substrate	OSB						B-Malt
Organism	None / control			Eurotium amstelodami			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Estragole (4-Allylanisole)	3.1	4	8.4	1.1	12	22.9	
Ethanol	255.9			143.4			216
Ethanol, 2-(2-ethoxyethoxy) (Diethylene glycol monoethy	7.1	13.3	29.1		39.3	67.2	
Formic acid (Methanoic acid)		3.6				6.8	
Heptanal (Heptaldehyde)	5.1	10.9	17.5	2.5	23.8	33.4	
Heptane				22.9	72.5	97.3	
Heptane, 2,4-dimethyl		2.3	6.1		6.3		
Heptane, 3-methyl					1.2	4.8	
Heptane, 4-methyl		10.6	25.4	1.5	5	6.2	
Hexanal	8.1	170.1	218	32.9	210	206.6	
Limonene (Dipentene; 1-Methyl-4-(1-methylethyl)cyclohex	27.4	39.1	67.5	20.9	186.7	353.2	
Methanol	34.6			11.7			
Nonyl aldehyde (Nonanal)	7.6	11.2	14.9	2.4	18.6	27.6	
Octanal	8	10.7	15.4	5	22.6	34.9	
Octane	0.4	11.4	32.3	7.5	119.9	139.7	
Octane, 4-methyl (8CI9CI)	4.2	3.9	8.3	0.8	11.2	6.7	
Pentane, 2,3,4-trimethyl						1.7	
Pentanoic acid (Valeric acid)	1.2	4.7	6.6		6.6	10.9	
Pinene, α (2,6,6-Trimethyl-bicyclo[3.1.1]hept-2-ene)	90.7	349.3	420.3	93.4	496.1	613.6	
Pinene, ß (6,6-Dimethyl-2-methylene-bicyclo[3.1.1]hepta	60	107.6	170.3	35.2	292.9	457.4	
Toluene (Methylbenzene)	0.7	12.1	32	4.7	16	114.2	
Tricyclo[2.2.1.02,6]heptane, 1,7,7-trimethyl-	1.6	6	11.6	3.1	22.6	46.4	
Tridecane	0.5	1.3	1.3		1.3	2	15.1

Substrate	**OSB**						**B-Malt**
Organism	**None / control**			**Eurotium amstelodami**			
IVOC	**Week 1**	**Week 2**	**Week 3**	**Week 1**	**Week 2**	**Week 3**	**Positive Control**
Undecane	5.3	8.5	13	2.9	17.1	32	
Xylene (para and/or meta)	1.6	3.4	7.1	0.5	10	13.6	28.6

Table H-19: IVOC Emissions from Chaetomium globosum on Oriented Strand Board (ng)

Substrate	OSB						B-Malt
Organism	None / control			Chaetomium globosum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
(+)-Camphene	9.2	41.3	92.2	281.7	435.2	1186.7	
1,4-Cyclohexadiene, 1-methyl-4-(1-methylethyl)- (9CI)					48.7		
1-Heptene, 2,4-dimethyl		12.5	26.9	19.1	221.3	212.2	
1-Hexanol, 2-ethyl	7.3	7.2	12.2	115.8	107.1	119	60.1
1-Nonanol				13.2			
1-Octene			4.5		11.1		
1-Pentanol (N-Pentyl alcohol)	1.9	10.6	46.5	67.6	872.3	42.7	
1-Pentene, 2-methyl				85.1			
1-Undecene	0.8	1.3	2.6	30.6		37.7	
2-Butanone (Methyl ethyl ketone, MEK)	0.6			71.6			
2-Heptanone	6.1	15.4	27.3	159.4	300.6	266.6	
2-Hexanone		5.6	11.3	12.4	108.4	180.7	
2-Pentanone	0.6	4.6	9.3	82.1	142.7	126.4	
2-Pentanone, 4-methyl (Methyl isobutyl ketone, MIBK)		5.3	7.2	16.5	199.8	266.3	
2-Propenal, 2-methyl				18.5			
2-n-Butylacrolein		10.4	20.4	116.4	206.5	198	
Acetate, ethyl	0.8	6.9	15.7	157.4	189.2	144.5	
Acetate, methyl (Acetic acid, methyl ester)				45.9			
Acetic acid	31.9	94	109.7	1586.5	826.3	1527.6	6.1
Acetic acid, pentyl ester			4.4		25.7		
Acetophenone (Ethanone, 1-phenyl) (9CI)	3.2		7.3		98.3		

Substrate	OSB						B-Malt
Organism	None / control			Chaetomium globosum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Benzaldehyde	4.6	12	20.2	89.2	214.8	447.7	
Benzaldehyde, 2-hydroxy		2.6	6.2		112.4	115.3	
Benzene, 1,2,3-trimethyl				112.6			
Benzene, 1-methoxy-4-(1-propenyl)		3.4			51.9	124.4	
Benzene, chloro	0.8	3.9	9.8		99	95	
Benzenemethanol, α,α-dimethyl-	2.7			79.3			
Benzofuran, 2-methyl						41.3	
Benzoic acid, 2-hydroxy-, methyl ester	7.3	254.4		76.8	3920.1	6090.8	
Benzothiazole	0.8	1.2	1.8	6.9	14.3		
Bicyclo[3.1.0]hex-2-ene, 4-methylene-1-(1-methylethyl)-	19.2	27.3		259.2	499.4		
Bicyclo[3.1.1]hept-3-en-2-one, 4,6,6-trimethyl-	1	2.9	2.9	13			
Bicyclo[3.1.1]heptan-3-ol, 6,6-dimethyl-2-methylene-, [					28.4	53.9	
Butanal				82.4			
Butanal, 2-methyl-					339.8	200.2	
Butanal, 3-methyl		4.6	7.7	146.7	198.3	107.7	
Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1α,2ß,5α)-(	2	35.3	4	37.2	701.4	1835	
Cyclopentasiloxane, decamethyl	2.9	3.7	6.2	40.5	96.2	107.2	52.8
Dodecane	4.3	6.2	7.8	51.3			6.9
Estragole (4-Allylanisole)	3.1	4	8.4	32.7	89.3	235.6	
Ethanol	255.9			5			

Substrate	OSB						B-Malt
Organism	None / control			Chaetomium globosum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Ethanol, 2-(2-ethoxyethoxy) (Diethylene glycol monoethy	7.1	13.3	29.1		226.5	329.1	
Fenchol, exo-	1.2	0.6	1.2	11	16.1	13.2	
Formic acid (Methanoic acid)		3.6					
Formic acid, 1-methylethyl ester				15.3			
Furan, 2-ethyl				27.4		28.9	
Furan, 3-methyl				16.4			
Heptanal (Heptaldehyde)	5.1	10.9	17.5	92	153.5	113.6	
Heptane						19.8	
Heptane, 2,4-dimethyl		2.3	6.1		35.5	28.6	
Heptane, 4-methyl		10.6	25.4	27.7	263.2	217.9	
Hexanal	8.1	170.1	218	157.8	2536.8	2139.3	
Hexane				39.5			
Hexanoic acid	6.6	0.4	34.4			265.2	
Limonene (Dipentene; 1-Methyl-4-(1-methylethyl)cyclohex	27.4	39.1	67.5	610.4	876	1499.8	
Nonyl aldehyde (Nonanal)	7.6	11.2	14.9	115.5	130.1	224.9	
Octanal	8	10.7	15.4	136.2	130.9	130.1	
Octane	0.4	11.4	32.3	21.3	289.9	390	
Octane, 4-methyl (8CI9CI)	4.2	3.9	8.3		67.2	51.2	
Pentadecane						14.7	
Pentanal	4.3	29.1	48.2	430.8	568.9	447.9	
Pentane, 2-methyl				12.7			
Pentanoic acid (Valeric acid)	1.2	4.7	6.6			52.6	
Pinene, α (2,6,6-Trimethyl-bicyclo[3.1.1]hept-2-ene)	90.7	349.3	420.3	3835.5	6369.3	6323.6	

Substrate	OSB						B-Malt
Organism	None / control			Chaetomium globosum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Pinene, ß (6,6-Dimethyl-2-methylene-bicyclo[3.1.1]hepta	60	107.6	170.3	1289	1954.6	1634.9	
Propanal, 2-methyl (Isobutanal)				36.5			
Propane, 2-ethoxy-2-methyl				20.4			
Toluene (Methylbenzene)	0.7	12.1	32	36.9	502.7	616.6	
Tricyclo[2.2.1.02,6]heptane, 1,7,7-trimethyl-	1.6	6	11.6	50.1	101.3	138.4	
Tridecane	0.5	1.3	1.3		27.1	48	
Undecane	5.3	8.5	13	141.8	156.6	375.8	10.5
Xylene (para and/or meta)	1.6	3.4	7.1		62	60.9	42.6

Table H-20: IVOC Emissions from Aspergillus versicolor on Oriented Strand Board (ng)

Substrate	OSB						B-Malt
Organism	None / control			Aspergillus versicolor			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
(+)-Camphene	9.2	41.3	92.2		2466.6	6469.3	
1,4-Cyclohexadiene, 1-methyl-4-(1-methylethyl)- (9CI)				78.6	190.3	332	
1-Butanol (N-Butyl alcohol)	0.6			29.9			
1-Heptene, 2,4-dimethyl		12.5	26.9	163.4	416.8	962.7	
1-Hexanol, 2-ethyl	7.3	7.2	12.2	205.4	549.3	751.5	
1-Octene			4.5		117		
1-Pentanol (N-Pentyl alcohol)	1.9	10.6	46.5	57.4	1345.3	1676.8	
1-Phenyl-1-propene, 2-methyl						506.9	
1-Undecene	0.8	1.3	2.6	39.7	82.6	153.5	
2,6-Dimethyl-1,3,5,7-octatetraene, E				270.7	715.4	603.5	
2-Ethylacrolein					76.9	88.4	
2-Heptanone	6.1	15.4	27.3	360.9	1434.7	2329.8	
2-Hexanone		5.6	11.3	16.9	306.8	818	
2-Pentanone	0.6	4.6	9.3	50.2	536.7	747.4	
2-Pentanone, 4-methyl (Methyl isobutyl ketone, MIBK)		5.3	7.2	15.0	712.4	1014.1	
2-n-Butylacrolein		10.4	20.4	290.1	1261.5	1948.1	
3-Cyclopentene-1-acetaldehyde, 2,2,3-trimethyl-				17.1	141.2	356.4	
3-Heptanone				17.9		147.7	
Acetate, ethyl	0.8	6.9	15.7	33.1	305.9	700.8	
Acetic acid	31.9	94	109.7	1236.2	1248.1	2224.5	144
Acetic acid, pentyl ester			4.4		151.5	335.8	
Benzaldehyde	4.6	12	20.2	122.5	346.2	609.3	

Substrate	OSB						B-Malt
Organism	None / control			Aspergillus versicolor			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Benzene			18.7	31.2	496.2		
Benzene, 1-methyl-4-(1-methylethyl) (p-Cymene; 4-Isopro						180.7	50.9
Benzene, chloro	0.8	3.9	9.8	39.8	282.4	529.8	
Benzene, ethyl				60.9			
Bicyclo[2.2.1]heptan-2-one, 1,3,3-trimethyl						253.3	
Bicyclo[2.2.1]heptane, 7,7-dimethyl-2-methylene- (9CI)				159.7	638.7	979.3	
Bicyclo[3.1.0]hex-2-ene, 4-methylene-1-(1-methylethyl)-	19.2	27.3		2789.0	3420.4		
Bicyclo[3.1.0]hexan-3-ol, 4-methyl-1-(1-methylethyl)						52.1	
Bicyclo[3.1.0]hexan-3-ol, 4-methylene-1-(1-methylethyl)				36.4	168.7	329.7	
Bicyclo[3.1.1]hept-2-ene-2-carboxaldehyde, 6,6-dimethyl				46.2	204.6	416.2	
Bicyclo[3.1.1]hept-2-ene-2-methanol, 6,6-dimethyl-				16.6	118	228	
Bicyclo[3.1.1]hept-3-en-2-one, 4,6,6-trimethyl-	1	2.9	2.9	35.4	127.7	220.4	
Bicyclo[3.1.1]heptane, 6.6-dimethyl-2-methylene-, (1S)-					272.9	419.9	
Bicyclo[3.3.1]heptan-3-one, 6,6-dimethyl-2-methylene				78.5	259.5	480	
Butanal, 3-methyl		4.6	7.7	41.6	252.5	306.7	

Substrate	OSB						B-Malt
Organism	None / control			Aspergillus versicolor			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Cyclohexene, 1-methyl-4-(1-methylethylidene)				91.6	159.7	217.2	
Cyclohexene, 4-methylene-1-(1-methylethyl)-				114.1		402.3	
Cyclopentasiloxane, decamethyl	2.9	3.7	6.2	48.3	155		
Decane, 5,6-dipropyl-		1.3	1.2			27.1	
Dodecane	4.3	6.2	7.8	52.0	248.4	415.2	
Ethanol	255.9			1092.1	17918	3295.3	
Ethanol, 2-(2-ethoxyethoxy) (Diethylene glycol monoethy	7.1	13.3	29.1	180.5		611.2	
Ethanol, 2-(2-methoxyethoxy)						1041	
Fenchol, exo-	1.2	0.6	1.2	11.6	46.2	85.4	
Formic acid (Methanoic acid)		3.6				1216.9	
Formic acid, pentyl ester (8CI9CI)			7	55.8	248.4	428.6	
Furan, 2,5-dimethyl-						22.2	
Furan, 2-ethyl				39.1	276.5	135.2	
Furan, 2-methyl-		0.5	0.6	18.2	55.6	33.6	
Furan, 2-propyl					231.7		
Heptanal (Heptaldehyde)	5.1	10.9	17.5	381.9	759.3	1228	
Heptane, 2,4-dimethyl		2.3	6.1		116	177.9	
Heptane, 4-methyl		10.6	25.4		763.4		
Hexanal	8.1	170.1	218	1882.4	4529.2	6019.1	
Limonene (Dipentene; 1-Methyl-4-(1-methylethyl)cyclohex	27.4	39.1	67.5	1376.5	3797	4856.1	
Nonyl aldehyde (Nonanal)	7.6	11.2	14.9	77.3	293		
Octanal	8	10.7	15.4	267.8	950	1170.3	

Substrate	OSB						B-Malt
Organism	None / control			Aspergillus versicolor			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Octane	0.4	11.4	32.3	203.6	1120.5	1337.4	
Octane, 4-methyl (8CI9CI)	4.2	3.9	8.3	47.4	142.4	300	
Pentanal	4.3	29.1	48.2	280.9	2601.2	1380.4	
Pentanoic acid (Valeric acid)	1.2	4.7	6.6			141.6	
Pentanoic acid, 4-methyl-, methyl ester					39.6		
Pinene, α (2,6,6-Trimethyl-bicyclo[3.1.1]hept-2-ene)	90.7	349.3	420.3	6837.2	8754.7	8810.1	
Pinene, ß (6,6-Dimethyl-2-methylene-bicyclo[3.1.1]hepta	60	107.6	170.3	5317.0	7669.5	8220.8	
Toluene (Methylbenzene)	0.7	12.1	32	33.9	1288.4	1838.7	
Tricyclo[2.2.1.02,6]heptane, 1,7,7-trimethyl-	1.6	6	11.6	394.2	1163.5	1474.8	
Tridecane	0.5	1.3	1.3		21.8	43.1	
Undecane	5.3	8.5	13	70.4	340.9	547.7	
Xylene (para and/or meta)	1.6	3.4	7.1		235.2	416.2	

Table H-21: VOC Emissions from Aspergillus versicolor on Oriented Strand Board (Duplicate Experiment) (ng)

Substrate	OSB						B-Malt
Organism	None / control			Aspergillus versicolor			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
(+)-Camphene			715.9		1788.9	1459.4	
1,3-Cyclohexadiene, 1-methyl-4-(1-methylethyl)-						30.9	
1,4-Cyclohexadiene, 1-methyl-4-(1-methylethyl)- (9CI)	62.1	86	112.4	68.9	284.2	292.2	
1-Butanol (N-Butyl alcohol)	29.9			32.5			
1-Heptene, 2,4-dimethyl	61	111.1	156	106.4	514.1	328.6	
1-Hexanol, 2-ethyl	190.5	127.9	278	217.4	324	487.4	
1-Nonene				12.2	81.7		
1-Octene				14.9			
1-Pentanol (N-Pentyl alcohol)	38	491.2	736.1	20.9		619.5	
1-Undecene	38.8	48.5	17.6	27.1	196.5	21.3	
2,6-Dimethyl-1,3,5,7-octatetraene, E		194.7		249.9		552.3	
2-Butanol, 2,3-dimethyl-							
2-Ethylacrolein		15	16.4				
2-Heptanone	259.8	334	633.4	295.4	956.1	972	
2-Hexanone	5.7	146.1	288.4	72.1		452.4	
2-Pentanone	41.1	77.2	405.3	56.7	132.5	214.1	
2-Pentanone, 4-methyl (Methyl isobutyl ketone, MIBK)	12.3	148.3	242.9	19	88.2	573.3	
2-Propanone, 1-hydroxy		43.3		31.9			
2-n-Butylacrolein	180.5	262.7	446.6	227.5	809.7	771.3	
3-Cyclopentene-1-acetaldehyde, 2,2,3-trimethyl-	25.5	35.9	78.9	16.3	64.2	218.1	
Acetate, ethyl	86.8	107.4	258.1	41.4	158.3	141	

Substrate	OSB						B-Malt
Organism	None / control			Aspergillus versicolor			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Acetic acid	1124.6	691.8	758.4	917.2	1611.9	1575.1	144
Benzaldehyde	132.8	105.4	252.2	75.4	331.9	490.3	
Benzene			161.2	35.6	132.6		
Benzene, chloro	23.4	59.5	136.2	33.7	180.5	179.8	
Benzene, ethyl							
Benzothiazole		19.2			42.3		
Bicyclo[2.2.1]heptane, 7,7-dimethyl-2-methylene- (9CI)	130.3	137.9	187.9	138.3	490	575.1	
Bicyclo[3.1.0]hex-2-ene, 4-methylene-1-(1-methylethyl)-	2048.4	1572.1	1290.9	2280.5	2949.3	3380.6	
Bicyclo[3.1.0]hexan-3-ol, 4-methylene-1-(1-methylethyl)-, (1	49.6	55.7	97.6	20.6	108.3	172.3	
Bicyclo[3.1.0]hexane, 4-methylene-1-(1-methylethyl)				39.3			
Bicyclo[3.1.1]hept-2-ene-2-carboxaldehyde, 6,6-dimethyl	52	58.9	102.4	13.2	120.6	285.2	
Bicyclo[3.1.1]hept-2-ene-2-methanol, 6,6-dimethyl-	17.3	53.5	56.6		92.7	224.3	
Bicyclo[3.1.1]hept-3-en-2-one, 4,6,6-trimethyl-	38.8	34.2	59.9	11.4		149.4	
Bicyclo[3.1.1]hept-3-en-2-one, 4,6,6-trimethyl-, (1S)-					56.5		
Bicyclo[3.3.1]heptan-3-one, 6,6-dimethyl-2-methylene	89.6	59.4	129.4	31.8	118.3	251.7	
Butanal, 2-methyl-		82.9				100.2	
Butanal, 3-methyl	30.1	57.7	72.2	45.4	117.7	120.4	
Butanoic acid, ethyl ester (Ethyl butyrate)						1	

Substrate	**OSB**						**B-Malt**
Organism	**None / control**			**Aspergillus versicolor**			
IVOC	**Week 1**	**Week 2**	**Week 3**	**Week 1**	**Week 2**	**Week 3**	**Positive Control**
Cyclohexene, 1-methyl-4-(1-methylethylidene)				79.6	209.4		
Cyclohexene, 4-methylene-1-(1-methylethyl)-	99.9		114.1	100.6	136	30.2	
Cyclopentasiloxane, decamethyl	50.2	70.4	85.8	43.7	198.2	176.2	
Decane, 5,6-dipropyl-				8.7			
Dodecane	55.8	103.8	190.9	41.4	235.2	504.8	
Ethanol	814.8	1850.5	2286	734.1	2633.1	3161.7	
Ethanol, 2-(2-ethoxyethoxy) (Diethylene glycol monoethyl ether)		164.5	473.4	90.2	705.4		
Ethanol, 2-butoxy	78.6	43.3	106.9	56.5	246.2	270.2	
Fenchol, exo-	15.4	16	17.1	9.2	49.2	45	
Formic acid, pentyl ester (8CI9CI)		58.1		41.5			
Furan, 2-ethyl	21.6	48.7	29.7	34.8	52.3	83.3	
Furan, 2-methyl-	3.7	11.3	6.5	16.7	42.6	20	
Furan, 2-propyl				27.2			
Heptanal (Heptaldehyde)	211.7	173.4	299.8	237.5	502.9	577.8	
Heptane, 2,4-dimethyl	34.1	26.2	71.1	24.5	226.2		
Heptane, 4-methyl	14.1	163.8	470.6		80.1	407.4	
Hexanal	1457.2	2539.3	2812.8	1725.6	3735.3	7064.8	
Limonene (Dipentene; 1-Methyl-4-(1-methylethyl)cyclohexene)	1174.4	1406.5	1622.2	1200.6	3545.7	4560.3	
Nonyl aldehyde (Nonanal)		127.3	202.7	70.6	328.7	557.4	
Octanal	259.4	177.7	311.7	289.5	729.5	1335.1	
Octane	72.1	176	263.7	186.4	756.6		

Substrate	OSB						B-Malt
Organism	None / control			Aspergillus versicolor			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Octane, 4-methyl (8CI9CI)	27.6	41.1	81.3	40.3	139.9	114.6	
Pentadecane							
Pentanal	230.7	403.3	481	319.8	603.5	654.5	
Pentanoic acid (Valeric acid)			69.9				
Pinene, α (2,6,6-Trimethyl-bicyclo[3.1.1]hept-2-ene)	6142.9	7229.5	7385.5	5982.8	9902.6	17599.7	
Pinene, ß (6,6-Dimethyl-2-methylene-bicyclo[3.1.1]heptane)	4851.4	4542.8	4816.5	5138.2	7163.8	14115.8	
Toluene (Methylbenzene)	24.6	231.3	416.3	35.6	739.4	744	
Tricyclo[2.2.1.02,6]heptane, 1,7,7-trimethyl-	197.8	157.6	197.9	233.8	555.5	505.1	
Tridecane	11.9	15.6			41.5	39	
Undecane	67.6	127.6	306.4	58.4	279.6	70.8	
Xylene (para and/or meta)	33.3	58.5	122.5	38.1	180.6	357.6	
Xylene, ortho							

Table H-22: IVOC Emissions from Stachybotrys chartarum on Kraft paper (ng)

Substrate	Kraft paper						B-Malt
Organism	None / control			Stachybotrys chartarum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
1-Heptene, 2,4-dimethyl	3.2	9.0	7.7	48.5	62.4	140.2	
1-Hexanol, 2-ethyl	3.0	7.7	7.7	90.7			
1-Undecene			1.8	10.1	25.9	58.9	
2,2,4-Trimethyl-1,3-pentanediol monoisobutyrate (Texanol)	0.8	1.8	2.5	10.4	225.1	40.1	
2-Hexenal, 2-ethyl-						71.8	
2-Propanone, 1-hydroxy	2.5	11.1	3.3			12.4	
Acetate, ethyl					20.7	82.8	
Acetic acid	0.4	1.0	0.7	12.4	17.4	55.3	291
Acetic acid, 1-methylethyl ester (Isopropyl acetate)						13.9	
Benzene, methoxy-				165.6	134.1	423.8	10.2
Benzenemethanol, α,α-dimethyl-		3.9	6.0	14.7	49.2	61.2	
Benzoic acid, 2-hydroxy-, methyl ester	5.4	359.4	30.7	40.8	129.9	407.7	
Benzothiazole		0.9	0.7			9.8	
Cyclohexane	0.5	2.5	3.6			13.8	
Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1α,2ß,5α)-(+/-)	1.1	50.3	5.4			52.7	
Cyclopentasiloxane, decamethyl	0.7	2.6	3.1	16.0	36.8	69.4	86.3
Cyclotetrasiloxane, octamethyl						9.7	
Decane		6.1	3.1	10.4	44.5	96.3	
Decane, 2-methyl		0.7			21.7	38.4	
Decane, 3-methyl		1.2	1.2		24.9	52.7	
Dodecane	2.0	6.7		56.4	87.1	141.1	

Substrate	Kraft paper						B-Malt
Organism	None / control			Stachybotrys chartarum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Ethanol	6.6				823.4	524.9	
Ethanol, 2-(2-ethoxyethoxy) (Diethylene glycol monoethyl et	5.2	16.1	23.2	100.8	313.6	426.5	
Ethanol, 2-(2-methoxyethoxy)		0.4	0.6		13.3		
Ethanol, 2-butoxy		2.5			13.1		
Heptane, 2,4-dimethyl		1.5	1.1	11.3	28.4	21.0	
Heptane, 4-methyl	0.6	3.4	2.5	22.9	0.2	14.7	
Limonene (Dipentene; 1-Methyl-4-(1-methylethyl)cyclohexene)		1.3				18.1	
Octane, 2-methyl						19.5	
Octane, 4-methyl (8CI9CI)	0.5	2.8	1.3	11.0	13.1	31.5	
Pentadecane					19.9	59.7	
Propane, 2-ethoxy-2-methyl						10.5	
Toluene (Methylbenzene)		1.6	1.9	21.4	33.9	25.3	
Tridecane		1.5	1.9	5.8	14.6	21.0	2.8
Undecane	5.0	14.9	17.2	107.3	191.0	426.5	45.1

Table H-23: VOC Emissions from Cladosporium sphaerospermum on Kraft paper (ng)

Substrate	Kraft paper						B-Malt
Organism	None / control			Cladosporium sphaerospermum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
1-Heptene, 2,4-dimethyl	3.2	9.0	7.7		4.2	7.3	
1-Hexanol, 2-ethyl	3.0	7.7	7.7	3.3	5.2	10.6	
1-Undecene			1.8		1.0	2.6	
2,2,4-Trimethyl-1,3-pentanediol monoisobutyrate (Texanol)	0.8	1.8	2.5	1.5	1.5	2.1	
2,2-Dimethyl-1-isopropyl-1,3-propanediol monoisobutyrate (T	1.9	3.3	4.0	1.9	2.3	4.0	
2-Propanol (Isopropanol)				3.9			
2-Propanone, 1-hydroxy	2.5	11.1	3.3	5.0	9.7	12.3	
Acetaldehyde				2.5			
Acetic acid	0.4	1.0	0.7	0.4		0.3	
Acetone	5.9			5.4			
Benzene, 1-methoxy-4-(1-propenyl)		3.7		1.0			
Benzenemethanol, α,α-dimethyl-		3.9	6.0		3.4	7.3	
Benzothiazole		0.9	0.7		1.3	0.8	
Cyclohexane	0.5	2.5	3.6		2.9	2.6	
Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1α,2ß,5α)-(+/-)	1.1	50.3	5.4	20.4	4.5	1.6	
Cyclopentasiloxane, decamethyl	0.7	2.6	3.1	0.5	1.2	2.3	67.3
Decane		6.1	3.1	1.1	1.8	2.4	
Decane, 2-methyl		0.7				2.4	
Decane, 3-methyl		1.2	1.2			1.9	
Decane, 5,6-dipropyl-		0.5	0.8		0.9	1.5	
Dodecane	2.0	6.7		1.2	3.5	5.7	

Substrate	Kraft paper						B-Malt
Organism	**None / control**			**Cladosporium sphaerospermum**			
IVOC	**Week 1**	**Week 2**	**Week 3**	**Week 1**	**Week 2**	**Week 3**	**Positive Control**
Ethanol	6.6			22.6			13.8
Ethanol, 2-(2-ethoxyethoxy) (Diethylene glycol monoethyl et	5.2	16.1	23.2	6.4	13.6	21.6	
Ethanol, 2-(2-methoxyethoxy)		0.4	0.6		1.1	1.6	
Ethanol, 2-butoxy		2.5				1.1	
Heptane, 2,4-dimethyl		1.5	1.1		0.6	1.3	
Heptane, 4-methyl	0.6	3.4	2.5		1.2	2.1	
Methanol	7.1			7.4			
Octane		1.2	0.4		0.3	0.7	
Octane, 4-methyl (8CI9CI)	0.5	2.8	1.3		0.8	1.3	
Pentane, 2,3,4-trimethyl	1.2		1.4			2.1	
Phenol						1.0	
Toluene (Methylbenzene)		1.6	1.9		1.4	1.8	
Tridecane		1.5	1.9		0.9	1.2	6.2
Undecane	5.0	14.9	17.2	3.7	10.0	13.3	
Xylene (para and/or meta)		0.7				0.2	

Table H-24: IVOC Emissions from Aspergillus sydowii on Kraft paper (ng)

Substrate	Kraft paper						B-Malt
Organism	None / control			Aspergillus sydowii			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
1,2-Ethanediol (Ethylene glycol)				9			
1-Heptene, 2,4-dimethyl	3.2	9.0	7.7	104.7	168.7	213.8	
1-Hexanol, 2-ethyl	3.0	7.7	7.7	101.5	108.0	25.7	51
1-Pentene, 2-methyl				29.1			
1-Undecene			1.8	20.2	30.0	28.3	
2,2,4-Trimethyl-1,3-pentanediol monoisobutyrate (Texanol)	0.8	1.8	2.5	45.8	52.6	20.6	
2,2-Dimethyl-1-isopropyl-1,3-propanediol monoisobutyrate (T	1.9	3.3	4.0	35.7	84.3		
2-Hexenal, 2-ethyl-				27			
2-Propanone, 1-hydroxy	2.5	11.1	3.3	20.3	50.4	4.3	
3-Isopropoxy-1,1,1,7,7,7-hexamethyl-3,5,5-tris(trimethylsil					33.3		
Acetic acid	0.4	1.0	0.7	32.9		23.9	386
Benzoic acid, 2-hydroxy-, methyl ester	5.4	359.4	30.7	12.6	30.7	33.9	
Cyclohexane	0.5	2.5	3.6	24.8	10.0	3.7	
Cyclohexasiloxane, dodecamethyl					75.4	32.9	
Cyclopentasiloxane, decamethyl	0.7	2.6	3.1	13.6	38.3	38.2	38.5
Decane		6.1	3.1	40.6	43.0	36.2	
Decane, 2,6-dimethyl			11.3				
Decane, 2-methyl		0.7			10.1	16.5	
Decane, 3-methyl		1.2	1.2		11.2		
Decane, 5,6-dipropyl-		0.5	0.8			10.7	

Substrate	Kraft paper						B-Malt
Organism	None / control			Aspergillus sydowii			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Dodecane	2.0	6.7		23.6	62.7	105.8	
Ethanol	6.6			52.2	145.9	144.1	
Ethanol, 2-(2-ethoxyethoxy) (Diethylene glycol monoethyl et	5.2	16.1	23.2	100.6	202.6	351.2	
Ethanol, 2-(2-methoxyethoxy)		0.4	0.6		6.3	8.3	
Heptane, 2,4-dimethyl		1.5	1.1	12.6	31.8	43.8	
Heptane, 4-methyl	0.6	3.4	2.5	39.9	144.8	43.9	
Octane		1.2	0.4	9.3		18.9	
Octane, 4-methyl (8CI9CI)	0.5	2.8	1.3	14.2	33.1	34.2	
Pentadecane						12.8	
Pentane				18.3			
Pentane, 2,3,4-trimethyl	1.2		1.4	34.4			
Toluene (Methylbenzene)		1.6	1.9		62.9	55.2	
Undecane	5.0	14.9	17.2	111.4	248.2	287.8	

Table H-25: IVOC Emissions from Eurotium amstelodami on Kraft paper (ng)

Substrate	Kraft paper						B-Malt
Organism	None / control			Eurotium amstelodami			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
1-Heptene, 2,4-dimethyl	3.2	9.0	7.7	2.7	10.1	26.5	
1-Hexanol, 2-ethyl	3.0	7.7	7.7	7.0	13.2	18.8	52.9
1-Octene		0.3				0.5	
1-Undecene			1.8		0.6	3.8	
2,2,4-Trimethyl-1,3-pentanediol monoisobutyrate (Texanol)	0.8	1.8	2.5		4.9	2.6	
2,2-Dimethyl-1-isopropyl-1,3-propanediol monoisobutyrate (T	1.9	3.3	4.0		7.0	1.9	
2-Heptanone		4.4	1.6			2.6	37
2-Hexanone		1.4	0.6			0.4	
2-Hexenal, 2-ethyl-				1.2	2.4		
2-Pentanone		2.1	1.1			1.0	
2-Propanone, 1-hydroxy	2.5	11.1	3.3	1.6	9.1	6.0	
3-Ethyl-3-methylheptane						8.4	
Acetate, ethyl						0.9	
Acetic acid	0.4	1.0	0.7			0.7	121
Benzaldehyde		0.7				0.7	
Benzene, 1,3,5-trimethyl (Mesitylene)						0.6	
Benzene, 1-ethyl-2-methyl (2-Ethyltoluene)		0.5				1.2	
Benzene, 1-ethyl-4-methyl (4-Ethyltoluene)		0.3				1.0	
Benzene, 1-methoxy-4-(1-propenyl)		3.7				4.6	
Benzene, ethyl						0.9	

Substrate	Kraft paper						B-Malt
Organism	None / control			Eurotium amstelodami			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Benzenemethanol, α,α-dimethyl-		3.9	6.0		5.0		
Benzoic acid, 2-hydroxy-, methyl ester	5.4	359.4	30.7		17.2	373.6	
Cyclohexane	0.5	2.5	3.6		1.4	6.0	
Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1α,2ß,5α)-(+/-)	1.1	50.3	5.4		3.1	88.2	
Cyclopentasiloxane, decamethyl	0.7	2.6	3.1		2.3	6.1	
Cyclotetrasiloxane, octamethyl						1.1	
Cyclotrisiloxane, hexamethyl						0.5	
Decane		6.1	3.1	0.6	4.6	9.8	
Decane, 2,6-dimethyl			11.3				
Decane, 2-methyl		0.7			2.0	4.1	
Decane, 3-methyl		1.2	1.2		1.3	4.9	
Decane, 5,6-dipropyl-		0.5	0.8		1.0	0.8	
Dodecane	2.0	6.7		0.8	5.5		
Ethanol, 2-(2-ethoxyethoxy) (Diethylene glycol monoethyl et	5.2	16.1	23.2		17.0	21.6	
Ethanol, 2-(2-methoxyethoxy)		0.4	0.6		2.4	1.5	
Ethanol, 2-butoxy		2.5			0.9	1.1	
Formic acid (Methanoic acid)					0.3		
Heptane		0.2				1.1	
Heptane, 2,4-dimethyl		1.5	1.1	0.6	2.0	4.2	
Heptane, 4-methyl	0.6	3.4	2.5	0.8	1.0	13.2	
Hexanal						0.6	
Limonene (Dipentene; 1-Methyl-4-(1-methylethyl)cyclohexene)		1.3			0.7	3.5	
Methanol	7.1			2.7			

Substrate	Kraft paper						B-Malt
Organism	None / control			Eurotium amstelodami			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Nonane						1.7	
Octane		1.2	0.4		1.4	1.4	
Octane, 4-methyl (8CI9CI)	0.5	2.8	1.3	0.4	1.9	7.2	
Pentane, 2,3,4-trimethyl	1.2		1.4		0.2	1.1	
Phenol, 2-methoxy		2.4	5.2		2.2	7.2	
Styrene						1.5	73.1
Toluene (Methylbenzene)		1.6	1.9		1.8	2.2	
Tridecane		1.5	1.9		0.8	1.5	15.1
Undecane	5.0	14.9	17.2	2.9	17.6	40.1	
Xylene (para and/or meta)		0.7				1.8	28.6

Table H-26: IVOC Emissions from Chaetomium globosum on Kraft paper (ng)

Substrate	Kraft paper						**B-Malt**
Organism	**None / control**			**Chaetomium globosum**			
IVOC	**Week 1**	**Week 2**	**Week 3**	**Week 1**	**Week 2**	**Week 3**	**Positive Control**
1,2-Propanediol (Propylene glycol)						1.3	
1-Heptene, 2,4-dimethyl	3.2	9.0	7.7	8.1	31.6	29.3	
1-Hexanol, 2-ethyl	3.0	7.7	7.7	7.1	20.5	33.8	60.1
1-Octene		0.3			0.7		
1-Undecene			1.8	0.8	3.2	3.9	
2,2,4-Trimethyl-1,3-pentanediol monoisobutyrate (Texanol)	0.8	1.8	2.5		0.7	2.0	
2,2-Dimethyl-1-isopropyl-1,3-propanediol monoisobutyrate (T	1.9	3.3	4.0		0.8	1.3	
2-Heptanone		4.4	1.6	0.7	2.4	2.4	
2-Hexanone		1.4	0.6			0.5	
2-Hexenal, 2-ethyl-					4.3	4.8	
2-Propanone, 1-hydroxy	2.5	11.1	3.3	8.2	12.3	17.8	
3-Heptanone						0.8	
3-Octanone				1.4	3.8	4.3	29.9
Acetic acid	0.4	1.0	0.7	0.9	2.0	2.5	6.1
Acetophenone (Ethanone, 1-phenyl) (9CI)					9.3		
Benzaldehyde		0.7			1.0	0.9	
Benzene, 1,3,5-trimethyl (Mesitylene)					0.3	0.4	
Benzene, 1-ethyl-4-methyl (4-Ethyltoluene)		0.3			1.4	1.2	
Benzene, ethyl					0.8		
Benzenemethanol, α,α-dimethyl-		3.9	6.0		8.7	10.8	

Substrate	Kraft paper						**B-Malt**
Organism	**None / control**			**Chaetomium globosum**			
IVOC	**Week 1**	**Week 2**	**Week 3**	**Week 1**	**Week 2**	**Week 3**	**Positive Control**
Benzoic acid, 2-hydroxy-, methyl ester	5.4	359.4	30.7	1.2	5.8	5.9	
Benzothiazole		0.9	0.7				
Cyclohexane	0.5	2.5	3.6	1.0	3.2	2.7	
Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1α,2ß,5α)-(+/-)	1.1	50.3	5.4	0.9	3.5		
Cyclopentasiloxane, decamethyl	0.7	2.6	3.1		3.6	4.2	52.8
Cyclotetrasiloxane, octamethyl					1.0		
Cyclotrisiloxane, hexamethyl					0.3		
Decane		6.1	3.1	1.6	9.2	9.5	11.8
Decane, 2,6-dimethyl			11.3	1.0			
Decane, 2-methyl		0.7		0.9	1.5		
Decane, 3-methyl		1.2	1.2	0.5	2.4	4.4	
Decane, 5,6-dipropyl-		0.5	0.8	0.7	0.7	0.9	
Dodecane	2.0	6.7		1.7	5.6	12.0	6.9
Ethanol, 2-(2-ethoxyethoxy) (Diethylene glycol monoethyl et	5.2	16.1	23.2	7.7	24.5	48.1	
Ethanol, 2-(2-methoxyethoxy)		0.4	0.6		1.5	3.1	
Ethanol, 2-butoxy		2.5		0.2	1.8	4.6	
Heptane		0.2			0.9	0.5	
Heptane, 2,4-dimethyl		1.5	1.1	1.6	5.3	6.7	
Heptane, 4-methyl	0.6	3.4	2.5	4.0	14.9	11.3	
Hexanal					1.6	0.5	
Hexanal, 2-ethyl					1.6		
Hexane, 2,3,5-trimethyl (8CI9CI)					0.5		
Limonene (Dipentene; 1-Methyl-4-(1-methylethyl)cyclohexene)		1.3			3.0	3.4	

Substrate	Kraft paper						B-Malt
Organism	None / control			Chaetomium globosum			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Nonane					1.3	1.2	
Octane		1.2	0.4		2.8	1.1	
Octane, 4-methyl (8CI9CI)	0.5	2.8	1.3	1.9	8.1	7.8	
Pentane, 2,3,4-trimethyl	1.2		1.4			2.3	
Phenol, 2-methoxy		2.4	5.2	0.7	4.8	5.2	
Pinene, α (2,6,6-Trimethyl-bicyclo[3.1.1]hept-2-ene)					0.2		
Styrene					2.3	2.8	
Toluene (Methylbenzene)		1.6	1.9	0.7	4.5	2.5	
Tridecane		1.5	1.9	0.3	0.7	1.1	
Undecane	5.0	14.9	17.2	4.9	17.8	32.6	10.5
Xylene (para and/or meta)		0.7			2.1	1.7	42.6

Table H-27: IVOC Emissions from Aspergillus versicolor on Kraft paper (ng)

Substrate	Kraft paper						B-Malt
Organism	None / control			Aspergillus versicolor			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
1-Heptene, 2,4-dimethyl	3.2	9.0	7.7	33.9	143.1	145.4	
1-Hexanol, 2-ethyl	3.0	7.7	7.7	58.2		30.9	
1-Nonanol						5.1	
1-Undecene			1.8	17.7	48.8	47.5	
2-Hexenal, 2-ethyl-					66.1		
2-Propanone, 1-hydroxy	2.5	11.1	3.3		5.6		
3-Heptanone						11.0	
Acetate, ethyl				17.2	2.7	23.7	
Acetic acid	0.4	1.0	0.7	17.2	15.8	19.3	144
Acetophenone (Ethanone, 1-phenyl) (9CI)				5.1	42.8	54.8	
Benzenemethanol, α,α-dimethyl-		3.9	6.0	9.5	32.2	42.3	
Cyclohexane	0.5	2.5	3.6	7.8	13.0	9.0	
Cyclopentasiloxane, decamethyl	0.7	2.6	3.1	10.6	31.2	41.8	
Decane		6.1	3.1	37.8	54.8	51.0	
Decane, 2-methyl		0.7		10.2	22.4	22.5	
Decane, 3-methyl		1.2	1.2	19.3	33.2	24.6	
Decane, 4-methyl		0.3	1.7	14.9	24.1	16.2	
Decane, 5,6-dipropyl-		0.5	0.8		10.8	7.7	
Dodecane	2.0	6.7		18.1	41.0	55.2	
Ethanol	6.6			593.5	562.7	931.4	
Ethanol, 2-(2-ethoxyethoxy) (Diethylene glycol monoethyl et	5.2	16.1	23.2	71.5	200.5	300.5	
Ethanol, 2-(2-methoxyethoxy)		0.4	0.6	47.1	77.8	124.2	
Ethanol, 2-butoxy		2.5		22.1	72.9	104.8	

Substrate	Kraft paper						B-Malt
Organism	None / control			Aspergillus versicolor			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Heptane, 2,2,6,6-tetramethyl						13.0	
Heptane, 2,4-dimethyl		1.5	1.1	4.4	24.6	25.8	
Heptane, 4-methyl	0.6	3.4	2.5	17.6	10.0	11.2	
Octane		1.2	0.4	4.3		8.4	
Octane, 2-methyl					17.9	13.3	
Octane, 4-methyl (8CI9CI)	0.5	2.8	1.3	13.0	35.3	38.3	
Toluene (Methylbenzene)		1.6	1.9	12.8	13.3	2.8	
Tridecane		1.5	1.9		9.5	29.8	
Undecane	5.0	14.9	17.2	60.0	130.4	136.5	

Table H-28: IVOC Emissions from Aspergillus versicolor on Kraft paper (Duplicate Experiment) (ng)

Substrate	Kraft paper						B-Malt
Organism	None / control			Aspergillus versicolor			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
1-Dodecanol					68.2	175.2	
1-Heptene, 2,4-dimethyl	40	182.2	274.5	20	173.4	212.3	
1-Hexanol, 2-ethyl	49.1	105.1	158.5	62.5	210.6	211.3	
1-Undecene	18.3	65.9	98.6	13.7	67.3	82.6	
2-Heptanone	39.7	136.8	69.4	11.5			
2-Hexenal, 2-ethyl-				30.4	96.4	71.1	
Acetate, ethyl	27.8	30.5	9	52.5	39.5	53.3	
Acetic acid	27.2	30				20.4	144
Acetophenone (Ethanone, 1-phenyl) (9CI)				2.1	55.8	54.3	
Benzaldehyde	16	34.7	40.3		14.4		
Benzenemethanol, α,α-dimethyl-					47.8	73.8	
Cyclohexane	12.3	13.3	43.1	47	38.5	7.5	
Cyclopentasiloxane, decamethyl	9.3	47.2	86	18.4	53.8	57.3	
Cyclotetrasiloxane, octamethyl					15.5		
Decane	42.3	109.1	87.8	32	66.8	84.2	
Decane, 2-methyl	7.9	38.3	52.2		32.5	46.4	
Decane, 3-methyl	19.5	57.3	57.7	12.1	54.8	59.3	
Decane, 4-methyl	10.1	33.5	34.9	8.9	34.6	34.8	
Decane, 5,6-dipropyl-	10.7	24.3	39.9	5.4		42.2	
Dodecane	20.7	66.5	72.1	19.8	52.7	68.9	
Ethanol	686.4	1243.8	986.2	236.1	998.8	1202.2	
Ethanol, 2-(2-ethoxyethoxy) (Diethylene glycol monoethyl ether)	19.7	184.7	115.2	16.6	86	148.2	

Substrate	Kraft paper						B-Malt
Organism	None / control			Aspergillus versicolor			
IVOC	Week 1	Week 2	Week 3	Week 1	Week 2	Week 3	Positive Control
Ethanol, 2-(2-methoxyethoxy)	35.9	104.5	94	13.5	80	95.5	
Ethanol, 2-butoxy	119.8	280	378.3	31.8	25.4	55.1	
Heptane			11.7		6.2		
Heptane, 2,2,6,6-tetramethyl				8.2	16.1	28.8	
Heptane, 2,4-dimethyl	6.4	25.1	34.2	4.3	28.1	33	
Heptane, 4-methyl	18.5	64.6	89.5	15.1	73.7	81.5	
Hexanal	38.7	39.4	31.8	5.7	8.1		
Nonane					6.2		
Octane	5.8	18.5	7.9		10.8	8	
Octane, 2-methyl		44.9			10.8	20.4	
Octane, 4-methyl (8CI9CI)	18.7	78.9	80.6	9.6	42.7	50.3	
Pentadecane		98.2	103.1			81.8	
Propane, 2-ethoxy-2-methyl			20.6		17.8	18.6	
Toluene (Methylbenzene)	12.7	20.7	34.2	10	24.3	24.1	
Tridecane	0.9	14.2			16.1	35.5	
Undecane	82.8	311.3	319	46.7	196.6	234.4	

Table H-29: IVOC Target List Emissions from Media (Positive Control) (ng)

Test		2	3	1	2	3	4	5	6
Organism	None / control			Cladosporium sphaerospermum	Eurotium amstelodami	Chaetomium globosum	Stachybotrys chartarum	Aspergillus sydowii	Aspergillus versicolor
MVOC Substrate	B-Malt1	Cellulose	CYA	B-Malt	CYA	Cellulose	B-Malt	CYA	CYA
1,3-Nonadiene*					46.9				
1,4-Cyclohexadiene, 1-methyl*							150.7		
1,6-Octadiene, 7-methyl-3-methylene (Myrcene)				19.8					
1-Hexanol, 2-ethyl			37.8		52.9	60.1		51	
1-Octen-3-ol					190.1			54.1	
1H-3a, 7-Methanoazulene, octahydro-3,8,8-trimethyl-6-methylen*								1166	
2-Butanone, 3-hydroxy*					500.5				
2-Butenoic acid, ethyl ester*							17.3		
2-Furanmethanol, 5-ethenyltetrahydro-.alpha.,.alpha., 5-trime*				37.1					
2-Heptanone					37				
3,7-Dimethyl-1,6-octadien-3-ol (Linalool)				115					
3,7-Dimethylnona-1,6-dien-3-ol					46.5				
3-Cyclohepten-1-one*					12.9				
3-Octanone						29.9			
Acetic acid					121	6.1	291	386	144
Benzene, 1,2,3-trimethyl							44.8	187.4	
Benzene, 1,2,4,5-tetramethyl				5.5					

Benzene, 1,3-dimethoxy*								856	
Benzene, 1,3-dimethyl-5-(1-methylethyl)*	31.9	24	26.2			7.6			
Benzene, 1-ethyl-4-methyl (4-Ethyltoluene)							22.5		
Benzene, 1-methyl-4-(1-methylethyl)(p-Cymene; 4-Isopropyltoluene)	862	583	600	138	411	1045	312	490	50.9
Benzene, 2-ethyl-1,4-dimethyl*						21			
Benzene, methoxy-*				19.5			10.2		
Benzyl benzoate				21.7					
Bicyclo[2.2.1]heptane, 2-butyl*					16.7				
Copane*								34.6	
Cyclohexane, 1-methyl-4-isopropyl, cis	36.1	12.9	14.8			21.3			
Cyclohexane, 1-methyl-4-isopropyl, trans	24.1		16.7	17.5		119			
Cyclopentane, 1,1,3-trimethyl-3-(2-methyl-2-propenyl)*								1233	
Cyclopentasiloxane, decamethyl	105	87.4	97	67.3		52.8	86.3	38.5	
Decane						11.8			
Decane, 2,3,8-trimethyl*					30.4				
Decane, 2,6-dimethyl							63.4		
Disulfide, dimethyl					1133				
Dodecane	33.9	36.3	43.2			6.9			
Ethanol	102	62.3	109	13.8	216				
Eucalyptol*				9.3					
Furan, 2-methyl-							19		
Furan, 2-pentyl					278			221	
Furan, 3-methyl							20		

Heptane, 5-ethyl-2,2,3-trimethyl*				18.7	9.6	43.8			
Naphthalene, 1,2,4a,5,6,8a-hexahydro-4,7-dimethyl-1-(1-methy*								211	
Nonane, 5-butyl*	117	75.9	86				27		
Nopyl acetate*				20.8					
Octane, 3,4,5,6-tetramethyl*							24.2		
Phenol, 2-(1-methylpropyl)*							18.9		
Propane, 1-methoxy-2-methyl*					25.8				
Propanoic acid, 2-hydroxy, ethyl ester*					246.5				
Spiro[5.5]undeca-1,8-diene, 1,5,599-tetramethyl *								114	
Styrene				7.1	73.1		164	80.6	
Thujopsene*								128	
Tricyclo[5.4.0.02,8]undec-9-ene, 2,6,6,9-tetramethyl*								417	
Tridecane				6.2	15.1		2.8		
Undecane	50.9	37.4	49.3			10.5	45.1		
Undecane, 2-methyl				9.1	10.1		3		
Unidentified				9.7	2.7	7.3	26.3	7.7	
Xylene (para and/or meta)	22.8	10	11.8		28.6	42.6	100		
Xyxlene, ortho	10.3	4.9	6.6			19.7			
t-Decahydronaphthalene	328	173	199		88.7	155	155		206

TABLE 1

GENERAL VOC ANALYSIS RESULTS
LIGHT GROWTH MIXED MOLD SAMPLE
(µg/m³)

Hour Point/Collection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
(+)-Borneol					
(E)-3(10)-Caren-4-ol					
(E)-Nerolidol ((E)-3,7,11-trimethyl-1,6,10-dodecatrien-3-ol					
1,1'-Biphenyl (9CI)					
1,1'-Biphenyl, 2,2'-diethyl		0.8	0.6	1.3	
1,1'-Biphenyl, 4-methyl			0.9	1.1	
1,3,5-Heptatriene, (E,E)-		1.4			
1,3,5-Hexatriene, 3-methyl-, (Z)-			0.6	0.6	0.1
1,3-Dioxane, 4,4-dimethyl-					
1,4-Cyclohexadiene, 1-methyl-					
1,4-Pentadiene					
1-Butanol (N-Butyl alcohol)		0.3	0.3	0.2	
1-Decanol (N-Decyl alcohol)					
1-Dodecanol					
1-Dodecene					
1H-2-Benzopyran-1-one, 3,4-dihydro-8-hydroxy-3-methyl-					
1-Heptanol					
1-Heptanol, 2-propyl (8CI9CI)					
1-Heptene					
1-Hexanol (N-Hexyl alcohol)					
1-Hexanol, 2-ethyl	0.2	28.5	23.7	20.7	4.3
1-Hexanol, 3-methyl					
1H-Indene, 2,3-dihydro-1,1,3-trimethyl-3-phenyl		1.0	0.8	1.8	
1-Octanol					
1-Octen-3-ol		0.9	0.6	0.5	
1-Pentadecene					
1-Pentanol (N-Pentyl alcohol)					
1-Pentanol, 2-ethyl					
1-Pentanol, 3,4-dimethyl					
1-Propanol, 2-methyl (Isobutyl alcohol)		0.2	0.2		
1-Tetradecanol					
1-Tridecanol		1.7	1.5	1.7	
1-Undecene		1.3	0.6	0.3	
2' ,3' ,4' Trimethoxyacetophenone					
2,2,4,4,5,5,7,7-Octamethyloctane					
2,2,4-Trimethyl-1,3-pentanediol monoisobutyrate (Texanol)		6.0	5.5	4.6	0.3
2,2-Dimethyl-1-isopropyl-1,3-propanediol monoisobutyrate (Texanol)					
2,2-Metaylenebiphenyl (Fluorene)		0.6	0.7	0.9	
2,3-Butanedione					
2,3-Pentanedione					
2,4-Pentanediol, 2-methyl (Hexylene glycol)		0.6	0.4	0.3	
2,5-Cyclohexadiene-1,4-dione, 2,6-bis(1,1-dimethylethyl)		2.5	2.1	2.2	0.2
2,5-Dimethyl-5-hexen-3-ol					
2,6-Diisopropylnaphthalene					
2,6-Dimethyl-1,3,5,7-octatetraene, E					
2,6-Di-tert-butyl-4-methylphenol (BHT)					
2,6-Octadiene, 2,6-dimethyl-					

TABLE 1

GENERAL VOC ANALYSIS RESULTS
LIGHT GROWTH MIXED MOLD SAMPLE
(µg/m³)

Hour Point/Collection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
2-Butanol, 2-methyl		0.3	0.2	0.2	
2-Butanol, 3-methyl		0.4	0.4	0.3	
2-Butanone (Methyl ethyl ketone, MEK)		3.0	2.2	1.8	0.2
2-Butanone, 3-hydroxy					
2-Butanone, 3-methyl		0.4	0.3		
2-Butanone, oxime					
2-Butenal, 3-methyl		1.0	0.8	0.7	
2-Cyclohexen-1-one, 3,5,5-trimethyl-		1.1	0.8	0.8	
2-Dodecene, (E)					
2-Dodecene, (Z)- (8CI9CI)					
2-Furanmethanol					
2-Furanmethanol, 5-ethenyltetrahydro-.alpha.,.alpha.,5-trime					
2-Heptanone		0.6	0.5	0.4	
2-Heptanone, 6-methyl					
2-Hexanone					
2-Hexanone, 4-methyl					
2-Nonanone					
2-Nonenal					
2-Octanone					
2-Pentanol, 2-methyl		0.4	0.3	0.2	
2-Pentanol, 3-methyl			0.1	0.1	
2-Pentanol, 4-methyl (8CI9CI)					
2-Pentanone		0.5	0.3	0.2	
2-Pentanone, 3-methyl		0.6	0.4	0.3	
2-Pentanone, 3-methylene					
2-Pentanone, 4-hydroxy-4-methyl- (8CI9CI)		0.8	0.5		
2-Pentanone, 4-methyl (Methyl isobutyl ketone, MIBK)		0.3	0.1		
2-Propanol (Isopropanol)		81.7	75.0	65.6	72.4
2-Propanol, 1-(2-methoxy-1-methylethoxy)					
2-Propanol, 1-(2-methoxypropoxy)-		0.5	0.3	0.4	
2-Propanol, 1-butoxy		2.9	2.5	2.7	0.2
2-Propanol, 1-methoxy (Dowanol)		1.5	1.4	1.3	
2-Propanol, 1-propoxy		0.4	0.3	0.3	
2-Propanol, 2-methyl		0.7	0.6	0.3	
2-Propenoic acid, 2-ethylhexyl ester (Iso octyl acrylate)		1.3	0.9	0.6	
2-Quinolinecarbonitrile, 4-methyl-					
2-Undecene, 8-methyl-, (Z) (9CI)					
3,5-Dimethyldodecane					
3,7-Dimethyl-1,6-octadien-3-ol (Linalool)					
3-Buten-1-ol, 3-methyl-		0.6	0.4	0.3	
3-Buten-2-ol, 2-methyl		0.8	0.8	0.8	
3-Cyclohexen-1-ol, 4-methyl-1-(1-methylethyl)					
3-Cyclohexene-1-methanol, α,α,4-trimethyl		2.9	2.4	2.2	0.4
3-Ethyl-3-methylheptane					
3-Heptanone, 6-methyl		7.6	5.7	5.2	
3-Hexadecene, (Z)- (8CI9CI)					
3-Hexanone, 4-methyl		0.2			
3-Hexanone, 5-methyl		0.5	0.2	0.3	

TABLE 1

GENERAL VOC ANALYSIS RESULTS
LIGHT GROWTH MIXED MOLD SAMPLE
(µg/m³)

Hour Point/Collection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
3-Hexen-2-one		0.2			
3-Octanol					
3-Octanone					0.7
3-Pentanol, 2-methyl		0.1	0.1		
3-Pentanone, 2,2-dimethyl-		0.3	0.3	0.3	
3-Pentanone, 2,4-dimethyl					
3-Pentanone, 2-methyl		0.1			
3-Penten-2-one, 4-methyl			0.2	0.2	
3-Tridecene, (Z)-					
4-Tetradecene, (Z)-					
4-Undecene, 9-methyl-, (Z)					
5-Dodecene, (E)					
5-Hepten-2-one, 6-methyl					
6-Dodecene, (E)					0.1
6-Undecanone					
7-Hexadecene, (Z)-					
7-Octen-2-ol, 2,6-dimethyl		1.2	0.9	0.7	
Acenaphthene		2.4	2.1	2.4	0.4
Acetic acid					0.1
Acetic acid, 1-methylethyl ester (Isopropyl acetate)					0.3
Acetic acid, 2-ethylhexyl ester		4.2	3.5	2.9	0.7
Acetone	0.4				
Acetophenone (Ethanone, 1-phenyl) (9CI)	0.1				
Anthracene, 1,2,3,4-tetrahydro-9-propyl-					
Benzaldehyde		0.6	0.5	0.4	
Benzamide, N-(1,1-dimethylethyl)-4-methoxy-					
Benzene, 1,2,3,4-tetramethyl		0.7			
Benzene, 1,2,3-trimethyl					
Benzene, 1,2,4,5-tetramethyl		0.4			
Benzene, 1,2,4-trimethyl		1.0	0.4	0.2	
Benzene, 1,2-dimethoxy-					
Benzene, 1,3-dichloro					
Benzene, 1,3-diethyl					
Benzene, 1-ethyl-4-methyl (4-Ethyltoluene)					
Benzene, 1-methoxy-3-methyl		2.0	1.2	0.8	
Benzene, 1-methyl-4-(1-methylethyl) (p-Cymene; 4-Isopropyltoluene)					
Benzene, 2-ethyl-1,4-dimethyl					
Benzene, ethyl		0.1			
Benzene, methoxy-		8.0	5.5	4.8	0.6
Benzenemethanol, .alpha.-ethyl-.alpha.-methyl-, (.+/-.)-					
Benzophenone (Diphenyl methanone)					
Benzothiazole		1.3	1.1		
Bicyclo[2.2.1]heptan-2-ol, 1,3,3-trimethyl		1.3	0.9	0.9	0.1
Bicyclo[2.2.1]heptan-2-one, 1,7,7-trimethyl-, (1R)		2.0	1.5	1.3	0.2
Bicyclo[2.2.1]heptan-2-one, 1,7,7-trimethyl-, (1S)					
Bicyclo[3.1.0]hexan-3-ol, 4-methylene-1-(1-methylethyl)-, (1		1.6	1.2	1.1	
Bicyclo[3.1.1]hept-2-ene-2-carboxaldehyde, 6,6-dimethyl					

TABLE 1

GENERAL VOC ANALYSIS RESULTS
LIGHT GROWTH MIXED MOLD SAMPLE
(µg/m³)

Hour Point/Collection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
Bicyclo[3.1.1]hept-3-en-2-ol, 4,6,6-trimethyl					
Bicyclo[3.1.1]hept-3-en-2-ol, 4,6,6-trimethyl-, (1.alpha.,2.					
Bicyclo[3.1.1]hept-3-en-2-one, 4,6,6-trimethyl-		2.0	1.5	1.4	
Bicyclo[3.1.1]hept-3-en-2-one, 4,6,6-trimethyl-, (1S)-					
Bicyclo[3.1.1]heptan-2-one, 6,6-dimethyl-		1.4	1.1	1.0	
Bicyclo[3.1.1]heptan-2-one, 6,6-dimethyl-, (1R)-					
Bicyclo[4.1.0]heptane, 3,7,7-trimethyl		2.2	1.7	1.5	
Butane, 1-ethoxy					
Cyclohexadecane					
Cyclohexane, (1,2-dimethylbutyl)					
Cyclohexane, 1-(cyclohexylmethyl)-3-methyl-, trans					
Cyclohexane, 1,1'-(1,3-propanediyl)bis					
Cyclohexane, 1,2,4-tris(methylene)					
Cyclohexane, decyl					
Cyclohexane, octyl					
Cyclohexanol			0.1		
Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1α,2ß,5α)-(+/-) (Menthol)					
Cyclohexanone, 3,3,5-trimethyl		4.2	1.8	0.9	
Cyclohexasiloxane, dodecamethyl		6.7	5.4	4.8	0.6
Cyclooctane, 1-methyl-3-propyl-					
Cyclopentane, 1-butyl-2-propyl (9CI)					
Cyclopentane, 1-pentyl-2-propyl					
Cyclopentane, methyl					
Cyclopentasiloxane, decamethyl		48.1	35.5	28.5	2.6
Cyclopentene, 1,2-dimethyl-4-methylene-		0.5			
Cyclopropane, 1-hexyl-2-methyl					
Cyclotetradecane					
Cyclotetrasiloxane, octamethyl		3.5	1.9	1.2	0.2
Cyclotrisiloxane, hexamethyl		2.6			0.3
Decanal	0.1				
Decane	0.1	2.1	1.0		
Decane, 2,3,5,8-tetramethyl-					
Decane, 2,3,7-trimethyl (9CI)					
Decane, 2,4,6-trimethyl (9CI)					
Decane, 2,5-dimethyl					
Decane, 2,6,7-trimethyl (9CI)					
Decane, 2,6-dimethyl					
Decane, 2,9-dimethyl (8CI9CI)					
Decane, 2-methyl		0.5	0.2		
Decane, 3,3,5-trimethyl (9CI)					
Decane, 3,6-dimethyl (8CI9CI)		2.7	1.4	0.6	
Decane, 3,7-dimethyl-					0.2
Decane, 3-methyl					0.3
Decane, 5,6-dipropyl-					
Dibenzofuran		1.1	1.1	1.4	
Dipropylene glycol monomethyl ether				0.6	
Disulfide, dimethyl		0.2	0.1	0.2	
Dodecane	0.1	3.5	2.6	2.1	0.4

TABLE 1

GENERAL VOC ANALYSIS RESULTS
LIGHT GROWTH MIXED MOLD SAMPLE
(µg/m³)

Hour Point/Collection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
Dodecane, 2,6,10-trimethyl					
Dodecane, 2,6,11-trimethyl		3.5	3.1	3.2	
Dodecane, 2-methyl					
Dodecane, 2-methyl-6-propyl		3.9	3.3	3.4	0.4
Dodecane, 3-methyl (8CI9CI)		2.6	1.9	1.7	
Dodecane, 4,6-dimethyl (9CI)		4.9	3.6	3.1	0.1
Dodecane, 4-methyl		1.1	0.7	0.6	
Eicosane		0.3	0.3	0.9	
Ethanol, 2-(dodecyloxy)					
Ethanol, 2-butoxy		9.4	9.3	7.9	0.6
Ethanol, 2-ethoxy					
Ethanone, 1-(1-cyclohexen-1-yl)					
Ethanone, 1-[4-(2-phenylethenyl)phenyl]-					
Ethyl-1-propenyl ether		0.4	0.3	0.2	
Formic acid, 1,1-dimethylethyl ester					
Formic acid, butyl ester		0.1			
Furan, 2-pentyl					
Heptadecane	0.1	1.2	1.1	1.7	0.2
Heptane					
Heptane, 2,2,3,3,5,6,6-heptamethyl					0.1
Heptane, 2,4,6-trimethyl					
Heptane, 2,4-dimethyl		0.3			
Hexadecane (Cetane)		3.2	2.8	3.4	0.5
Hexadecane, 2,6,10-trimethyl					
Hexadecane, 3-methyl					
Hexadecane, 7,9-dimethyl		1.5	1.5	2.0	
Hexadecane, 7-methyl-		0.9	0.9	1.3	
Hexanal					
Hexanal, 2-ethyl		0.9	0.5	0.5	
Hexane					
Hexane, 2-methyl					
Hexane, 3-methyl					
Hexanedinitrile (9CI) (Adiponitrile)					0.1
Hexanedioic acid, bis(2-ethylhexyl) ester					
Hexanenitrile		1.1	0.8	0.7	
Limonene (Dipentene; 1-Methyl-4-(1-methylethyl)cyclohexene)					
Linalool oxide (fr.1)		2.2	1.2	0.9	
Naphthalene	0.1	2.9	3.4	2.7	0.5
Naphthalene, 1,4-dimethyl					
Naphthalene, 1-ethyl					0.2
Naphthalene, 1-methyl		2.3	1.9	1.8	0.2
Naphthalene, 2,3-dimethyl					
Naphthalene, 2,7-dimethyl		2.0	2.4	2.0	
Naphthalene, 2-methyl					
n-Nonylcyclohexane					
Nonane		0.2			
Nonane, 2,5-dimethyl		8.1	3.4	1.3	0.3
Nonane, 2,6-dimethyl					

TABLE 1

GENERAL VOC ANALYSIS RESULTS
LIGHT GROWTH MIXED MOLD SAMPLE
(µg/m³)

Hour Point/Collection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
Nonane, 3,7-dimethyl		3.6	2.1	1.7	0.5
Nonane, 3-ethyl					
Nonane, 4-methyl					
Nonane, 4-methyl-5-propyl					
Nonyl aldehyde (Nonanal)	0.1				
Octadecane					
Octanal		0.5	0.3		
Octane, 2,3,3-trimethyl-					
Octane, 2,3,6,7-tetramethyl-		1.5	0.7	0.4	
Octane, 2,3,6-trimethyl					
Octane, 2,4,6-trimethyl					
Octane, 2-methyl					
Octane, 6-ethyl-2-methyl					
Oxetane, 2,2-dimethyl-		0.3	0.2		
Oxirane, (1-methylethyl)-		0.1	0.1	0.1	
Oxirane, 3-ethyl-2,2-dimethyl-		1.1	0.6	0.5	
Pentadecane	0.2	5.1	5.0	5.0	0.7
Pentadecane, 2,6,10-trimethyl-					
Pentadecane, 2-methyl					
Pentadecane, 3-methyl		1.5	1.5	1.6	
Pentadecane, 4-methyl					
Pentadecane, 5-methyl		3.2	2.8	3.0	0.3
Pentadecane, 7-methyl-		1.0	0.9	0.9	
Pentane, 2-methyl					
Pentane, 3-methyl					
Pentasiloxane, dodecamethyl		2.2	1.8	1.6	0.2
Phenol					
Phenol, 2,4-bis(1,1-dimethylethyl)-		1.2	1.0	1.1	
Phenol, 2,5-bis(1,1-dimethylethyl)					
Phenol, 4-methoxy-3-(methyoxymethyl)-					
Phenol, 4-t-butyl (4-(1,1-Dimethylethyl)phenol)					
Propanoic acid, 2,2-dimethyl-, 2-ethylhexyl ester		1.2	0.8	0.7	
Propanoic acid, 2-methyl-, 2-(hydroxymethyl)-1-propylbutyl ester					
Propanoic acid, 2-methyl-, 2-ethyl-1-propyl-1,3-propanediyl ester					
Quinoline, 1,2-dihydro-2,2,4-trimethyl-					
Styrene					
t-2-Pentenal					
Tetradecane	0.1	9.8	9.0	8.8	0.7
Tetradecane, 2,6,10-trimethyl-		1.7	1.4	1.8	
Tetradecane, 2-methyl					
Tetradecane, 4,11-dimethyl		1.3	1.2	1.2	
Tetradecane, 4-methyl					0.2
Tetradecane, 5-methyl		2.5	1.3	2.3	
Tetradecanoic acid, 1-methylethyl ester (Isopropyl Myristate)					
Toluene (Methylbenzene)	0.5	0.6	0.3	0.2	
Tridecane		1.8	1.3	1.1	0.5

TABLE 1

GENERAL VOC ANALYSIS RESULTS
LIGHT GROWTH MIXED MOLD SAMPLE
(µg/m³)

Hour Point/Collection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
Tridecane, 2-methyl		1.5	1.2	1.2	0.1
Tridecane, 3-methyl		1.3	1.0	0.8	0.1
Tridecane, 4,8-dimethyl		2.4	2.0	2.1	
Tridecane, 4-methyl		1.4	1.1	1.0	0.1
Tridecane, 5-methyl		1.4	1.0	1.0	0.3
Tridecane, 6-methyl					
Tridecane, 6-propyl					
Tridecane, 7-methyl		4.3	3.6	3.2	0.4
Tridecane, 7-propyl-					
TXIB (2,2,4-Trimethyl-1,3-pentanediol diisobutyrate)		3.6	3.5	3.8	0.4
Undecane		3.4	1.9	1.1	1.0
Undecane, 2,4-dimethyl		6.6	4.6	4.8	0.2
Undecane, 2,5-dimethyl					
Undecane, 2,6-dimethyl		1.5	1.3	0.9	0.2
Undecane, 2-methyl					
Undecane, 3,8-dimethyl					
Undecane, 3-methyl		0.5			
Undecane, 4-ethyl					
Undecane, 4-methyl		0.7	0.4		
Undecane, 5-methyl (8CI9CI)		7.0	4.1	2.6	
Undecane, 6-ethyl		1.5			
Xylene (para and/or meta)					
Xylene, ortho					
α-Methylstyrene (iso-Propenylbenzene; (1-Methylethenyl)benzene)					
Total VOCs	**2.5**	**410**	**321**	**288**	**95.0**

time and mass spectral characteristics with a probability of > 80%.

Individual volatile organic compounds are calibrated relative to toluene.

Quantifiable level is 0.04 µg based on a standard 18 L air collection volume.

Compounds with no values are found in one or more of the other samples

TABLE 2

GENERAL VOC ANALYSIS RESULTS
HEAVY GROWTH MIXED MOLD SAMPLE
(µg/m³)

Hour Point/Collection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
(+)-Borneol				0.8	
(E)-3(10)-Caren-4-ol					
(E)-Nerolidol ((E)-3,7,11-trimethyl-1,6,10-dodecatrien-3-ol					
1,1'-Biphenyl (9CI)			0.3		
1,1'-Biphenyl, 2,2'-diethyl					
1,1'-Biphenyl, 4-methyl					
1,3,5-Heptatriene, (E,E)-					
1,3,5-Hexatriene, 3-methyl-, (Z)-					
1,3-Dioxane, 4,4-dimethyl-			0.2		
1,4-Cyclohexadiene, 1-methyl-					
1,4-Pentadiene					
1-Butanol (N-Butyl alcohol)					
1-Decanol (N-Decyl alcohol)					
1-Dodecanol					
1-Dodecene					
1H-2-Benzopyran-1-one, 3,4-dihydro-8-hydroxy-3-methyl-		1.1	1.1	0.3	0.9
1-Heptanol					
1-Heptanol, 2-propyl (8CI9CI)					
1-Heptene					
1-Hexanol (N-Hexyl alcohol)					
1-Hexanol, 2-ethyl		7.1	5.7	4.8	4.7
1-Hexanol, 3-methyl					
1H-Indene, 2,3-dihydro-1,1,3-trimethyl-3-phenyl					
1-Octanol					
1-Octen-3-ol		0.4	0.4		0.3
1-Pentadecene			0.3	0.2	
1-Pentanol (N-Pentyl alcohol)					
1-Pentanol, 2-ethyl					
1-Pentanol, 3,4-dimethyl					
1-Propanol, 2-methyl (Isobutyl alcohol)					
1-Tetradecanol					
1-Tridecanol			0.2		0.4
1-Undecene		1.3	0.6	0.3	0.2
2' ,3' ,4' Trimethoxyacetophenone					
2,2,4,4,5,5,7,7-Octamethyloctane		0.8	0.3	0.3	0.4
2,2,4-Trimethyl-1,3-pentanediol monoisobutyrate (Texanol)		1.7	1.7	0.9	1.7
2,2-Dimethyl-1-isopropyl-1,3-propanediol monoisobutyrate (Texanol)					
2,2-Metaylenebiphenyl (Fluorene)					
2,3-Butanedione					
2,3-Pentanedione					
2,4-Pentanediol, 2-methyl (Hexylene glycol)					
2,5-Cyclohexadiene-1,4-dione, 2,6-bis(1,1-dimethylethyl)		0.5	0.3	0.2	0.5
2,5-Dimethyl-5-hexen-3-ol					
2,6-Diisopropylnaphthalene					
2,6-Dimethyl-1,3,5,7-octatetraene, E		1.4	1.2		
2,6-Di-tert-butyl-4-methylphenol (BHT)					
2,6-Octadiene, 2,6-dimethyl-					

TABLE 2

GENERAL VOC ANALYSIS RESULTS
HEAVY GROWTH MIXED MOLD SAMPLE
($\mu g/m^3$)

Hour Point/Collection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
2-Butanol, 2-methyl					
2-Butanol, 3-methyl					
2-Butanone (Methyl ethyl ketone, MEK)					
2-Butanone, 3-hydroxy					
2-Butanone, 3-methyl					
2-Butanone, oxime					
2-Butenal, 3-methyl					
2-Cyclohexen-1-one, 3,5,5-trimethyl-					
2-Dodecene, (E)					
2-Dodecene, (Z)- (8CI9CI)					
2-Furanmethanol					
2-Furanmethanol, 5-ethenyltetrahydro-.alpha.,.alpha.,5-trime					0.5
2-Heptanone		0.3	0.2		
2-Heptanone, 6-methyl					
2-Hexanone					
2-Hexanone, 4-methyl		0.4			
2-Nonanone					
2-Nonenal					
2-Octanone					
2-Pentanol, 2-methyl					
2-Pentanol, 3-methyl					
2-Pentanol, 4-methyl (8CI9CI)					
2-Pentanone					
2-Pentanone, 3-methyl					
2-Pentanone, 3-methylene					
2-Pentanone, 4-hydroxy-4-methyl- (8CI9CI)			0.3		
2-Pentanone, 4-methyl (Methyl isobutyl ketone, MIBK)		0.2			
2-Propanol (Isopropanol)					
2-Propanol, 1-(2-methoxy-1-methylethoxy)					
2-Propanol, 1-(2-methoxypropoxy)-					
2-Propanol, 1-butoxy		2.3	2.0	1.6	1.7
2-Propanol, 1-methoxy (Dowanol)		2.5	2.0	1.5	2.1
2-Propanol, 1-propoxy		0.3	0.2	0.1	0.2
2-Propanol, 2-methyl					
2-Propenoic acid, 2-ethylhexyl ester (Iso octyl acrylate)		0.2	0.2	0.1	
2-Quinolinecarbonitrile, 4-methyl-					
2-Undecene, 8-methyl-, (Z) (9CI)					
3,5-Dimethyldodecane		1.0	0.9	0.8	0.7
3,7-Dimethyl-1,6-octadien-3-ol (Linalool)					
3-Buten-1-ol, 3-methyl-					
3-Buten-2-ol, 2-methyl					
3-Cyclohexen-1-ol, 4-methyl-1-(1-methylethyl)		0.9	0.8	0.8	0.7
3-Cyclohexene-1-methanol, α,α,4-trimethyl		1.2	1.0	0.8	0.9
3-Ethyl-3-methylheptane					
3-Heptanone, 6-methyl					
3-Hexadecene, (Z)- (8CI9CI)					
3-Hexanone, 4-methyl					
3-Hexanone, 5-methyl					

TABLE 2

GENERAL VOC ANALYSIS RESULTS
HEAVY GROWTH MIXED MOLD SAMPLE
(µg/m³)

Hour Point/Collection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
3-Hexen-2-one					
3-Octanol					
3-Octanone		5.4			4.1
3-Pentanol, 2-methyl					
3-Pentanone, 2,2-dimethyl-					
3-Pentanone, 2,4-dimethyl					
3-Pentanone, 2-methyl					
3-Penten-2-one, 4-methyl					
3-Tridecene, (Z)-					
4-Tetradecene, (Z)-					
4-Undecene, 9-methyl-, (Z)					
5-Dodecene, (E)		1.6	0.8	0.6	
5-Hepten-2-one, 6-methyl			4.4	4.7	
6-Dodecene, (E)					
6-Undecanone					
7-Hexadecene, (Z)-					
7-Octen-2-ol, 2,6-dimethyl					
Acenaphthene		1.4	0.6	0.9	1.1
Acetic acid					
Acetic acid, 1-methylethyl ester (Isopropyl acetate)					
Acetic acid, 2-ethylhexyl ester		0.9	0.8	0.8	0.6
Acetone		10.5	7.1	7.7	6.8
Acetophenone (Ethanone, 1-phenyl) (9CI)					
Anthracene, 1,2,3,4-tetrahydro-9-propyl-					
Benzaldehyde		0.4	0.2	0.3	0.2
Benzamide, N-(1,1-dimethylethyl)-4-methoxy-					
Benzene, 1,2,3,4-tetramethyl		0.3			
Benzene, 1,2,3-trimethyl					
Benzene, 1,2,4,5-tetramethyl					
Benzene, 1,2,4-trimethyl		0.7			
Benzene, 1,2-dimethoxy-		0.7	0.4	0.3	0.2
Benzene, 1,3-dichloro					
Benzene, 1,3-diethyl				0.1	
Benzene, 1-ethyl-4-methyl (4-Ethyltoluene)		0.3			
Benzene, 1-methoxy-3-methyl					
Benzene, 1-methyl-4-(1-methylethyl) (p-Cymene; 4-Isopropyltoluene)	0.2	0.7	0.3	0.4	0.4
Benzene, 2-ethyl-1,4-dimethyl					
Benzene, ethyl		0.2	0.1		
Benzene, methoxy-		1.0	0.7	0.8	0.5
Benzenemethanol, .alpha.-ethyl-.alpha.-methyl-, (.+/-.)-					
Benzophenone (Diphenyl methanone)		0.5	0.4	0.4	0.4
Benzothiazole		0.2	0.2	0.2	0.2
Bicyclo[2.2.1]heptan-2-ol, 1,3,3-trimethyl		1.3	1.0	0.9	0.9
Bicyclo[2.2.1]heptan-2-one, 1,7,7-trimethyl-, (1R)		1.0	0.8	0.7	0.7
Bicyclo[2.2.1]heptan-2-one, 1,7,7-trimethyl-, (1S)					
Bicyclo[3.1.0]hexan-3-ol, 4-methylene-1-(1-methylethyl)-, (1					
Bicyclo[3.1.1]hept-2-ene-2-carboxaldehyde, 6,6-dimethyl					

TABLE 2

GENERAL VOC ANALYSIS RESULTS
HEAVY GROWTH MIXED MOLD SAMPLE
(µg/m³)

Hour Point/Collection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
Bicyclo[3.1.1]hept-3-en-2-ol, 4,6,6-trimethyl					
Bicyclo[3.1.1]hept-3-en-2-ol, 4,6,6-trimethyl-, (1.alpha.,2.				0.7	0.8
Bicyclo[3.1.1]hept-3-en-2-one, 4,6,6-trimethyl-					
Bicyclo[3.1.1]hept-3-en-2-one, 4,6,6-trimethyl-, (1S)-		1.1	1.0	0.9	0.9
Bicyclo[3.1.1]heptan-2-one, 6,6-dimethyl-					
Bicyclo[3.1.1]heptan-2-one, 6,6-dimethyl-, (1R)-		0.6	0.5	0.5	0.5
Bicyclo[4.1.0]heptane, 3,7,7-trimethyl					
Butane, 1-ethoxy					
Cyclohexadecane					
Cyclohexane, (1,2-dimethylbutyl)					
Cyclohexane, 1-(cyclohexylmethyl)-3-methyl-, trans					
Cyclohexane, 1,1'-(1,3-propanediyl)bis					
Cyclohexane, 1,2,4-tris(methylene)					
Cyclohexane, decyl					
Cyclohexane, octyl					
Cyclohexanol					
Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1α,2ß,5α)-(+/-) (Menthol)					
Cyclohexanone, 3,3,5-trimethyl					
Cyclohexasiloxane, dodecamethyl					
Cyclooctane, 1-methyl-3-propyl-					
Cyclopentane, 1-butyl-2-propyl (9CI)					
Cyclopentane, 1-pentyl-2-propyl					
Cyclopentane, methyl			0.1		
Cyclopentasiloxane, decamethyl		25.3	19.1	21.4	17.2
Cyclopentene, 1,2-dimethyl-4-methylene-					
Cyclopropane, 1-hexyl-2-methyl					
Cyclotetradecane		0.6	0.4	0.4	0.4
Cyclotetrasiloxane, octamethyl					
Cyclotrisiloxane, hexamethyl					
Decanal					
Decane		1.4	0.5		
Decane, 2,3,5,8-tetramethyl-		4.4	3.5	3.6	3.0
Decane, 2,3,7-trimethyl (9CI)					
Decane, 2,4,6-trimethyl (9CI)					
Decane, 2,5-dimethyl					
Decane, 2,6,7-trimethyl (9CI)		0.9	0.7	0.7	0.5
Decane, 2,6-dimethyl		6.6	3.4	2.2	1.5
Decane, 2,9-dimethyl (8CI9CI)					
Decane, 2-methyl					
Decane, 3,3,5-trimethyl (9CI)					
Decane, 3,6-dimethyl (8CI9CI)					
Decane, 3,7-dimethyl-					
Decane, 3-methyl					
Decane, 5,6-dipropyl-					
Dibenzofuran					
Dipropylene glycol monomethyl ether					
Disulfide, dimethyl					
Dodecane		1.9	1.1	0.9	0.8

TABLE 2

GENERAL VOC ANALYSIS RESULTS
HEAVY GROWTH MIXED MOLD SAMPLE
(µg/m³)

Hour Point/Collection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
Dodecane, 2,6,10-trimethyl		1.0	0.8	0.7	1.0
Dodecane, 2,6,11-trimethyl		1.4	1.3	1.2	1.4
Dodecane, 2-methyl		0.6	0.5	0.5	0.4
Dodecane, 2-methyl-6-propyl					
Dodecane, 3-methyl (8CI9CI)					
Dodecane, 4,6-dimethyl (9CI)		0.8	0.8	0.8	0.9
Dodecane, 4-methyl		0.4	0.3	0.2	0.2
Eicosane		0.4		0.3	0.3
Ethanol, 2-(dodecyloxy)		0.4	0.3		
Ethanol, 2-butoxy		1.6	1.4	0.7	1.1
Ethanol, 2-ethoxy					
Ethanone, 1-(1-cyclohexen-1-yl)					
Ethanone, 1-[4-(2-phenylethenyl)phenyl]-		0.2	0.1	0.2	
Ethyl-1-propenyl ether					
Formic acid, 1,1-dimethylethyl ester					
Formic acid, butyl ester					
Furan, 2-pentyl		0.3	0.2	0.2	0.2
Heptadecane		0.4	0.3	0.3	0.3
Heptane					
Heptane, 2,2,3,3,5,6,6-heptamethyl					
Heptane, 2,4,6-trimethyl					
Heptane, 2,4-dimethyl		0.3			
Hexadecane (Cetane)		1.6	1.0	1.4	1.4
Hexadecane, 2,6,10-trimethyl					
Hexadecane, 3-methyl					
Hexadecane, 7,9-dimethyl			0.3		
Hexadecane, 7-methyl-					
Hexanal					
Hexanal, 2-ethyl		0.4	0.2	0.2	
Hexane	1.1	2.1	1.9	1.7	1.8
Hexane, 2-methyl					
Hexane, 3-methyl					
Hexanedinitrile (9CI) (Adiponitrile)					
Hexanedioic acid, bis(2-ethylhexyl) ester					
Hexanenitrile					
Limonene (Dipentene; 1-Methyl-4-(1-methylethyl)cyclohexene)		0.8	0.2	0.2	0.1
Linalool oxide (fr.1)					
Naphthalene		0.9	0.6	0.5	0.5
Naphthalene, 1,4-dimethyl		0.6	0.6	0.3	0.3
Naphthalene, 1-ethyl					
Naphthalene, 1-methyl		0.8	0.8	0.8	0.8
Naphthalene, 2,3-dimethyl					
Naphthalene, 2,7-dimethyl					
Naphthalene, 2-methyl					
n-Nonylcyclohexane					
Nonane		0.1			
Nonane, 2,5-dimethyl					
Nonane, 2,6-dimethyl		3.0	1.3	0.7	0.2

TABLE 2

GENERAL VOC ANALYSIS RESULTS
HEAVY GROWTH MIXED MOLD SAMPLE
(µg/m³)

Hour Point/Collection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
Nonane, 3,7-dimethyl					
Nonane, 3-ethyl		9.9	4.1	1.9	0.8
Nonane, 4-methyl					
Nonane, 4-methyl-5-propyl		1.0	0.9	1.0	0.7
Nonyl aldehyde (Nonanal)	0.2				
Octadecane					
Octanal					
Octane, 2,3,3-trimethyl-					
Octane, 2,3,6,7-tetramethyl-					
Octane, 2,3,6-trimethyl		0.6	0.2		
Octane, 2,4,6-trimethyl		0.5	0.2		
Octane, 2-methyl		0.5			
Octane, 6-ethyl-2-methyl					
Oxetane, 2,2-dimethyl-					
Oxirane, (1-methylethyl)-					
Oxirane, 3-ethyl-2,2-dimethyl-		0.6	0.3	0.3	
Pentadecane		1.7	1.4	1.3	1.6
Pentadecane, 2,6,10-trimethyl-		0.3	0.3	0.3	0.3
Pentadecane, 2-methyl		0.7	0.5	0.2	0.6
Pentadecane, 3-methyl					
Pentadecane, 4-methyl		2.1	1.5	1.1	1.6
Pentadecane, 5-methyl					
Pentadecane, 7-methyl-		0.6	0.3		
Pentane, 2-methyl					
Pentane, 3-methyl					
Pentasiloxane, dodecamethyl					
Phenol					
Phenol, 2,4-bis(1,1-dimethylethyl)-					
Phenol, 2,5-bis(1,1-dimethylethyl)					
Phenol, 4-methoxy-3-(methyoxymethyl)-		0.3	0.2	0.2	0.3
Phenol, 4-t-butyl (4-(1,1-Dimethylethyl)phenol)					
Propanoic acid, 2,2-dimethyl-, 2-ethylhexyl ester					
Propanoic acid, 2-methyl-, 2-(hydroxymethyl)-1-propylbutyl ester					
Propanoic acid, 2-methyl-, 2-ethyl-1-propyl-1,3-propanediyl ester					
Quinoline, 1,2-dihydro-2,2,4-trimethyl-					
Styrene		0.4	0.2	0.2	0.2
t-2-Pentenal		0.4	0.4	0.3	0.2
Tetradecane		3.0	2.8	2.3	2.6
Tetradecane, 2,6,10-trimethyl-					
Tetradecane, 2-methyl		0.3	0.2	0.2	0.3
Tetradecane, 4,11-dimethyl					
Tetradecane, 4-methyl					
Tetradecane, 5-methyl		0.9	0.5	0.6	0.9
Tetradecanoic acid, 1-methylethyl ester (Isopropyl Myristate)					
Toluene (Methylbenzene)	6.2	6.3	7.2	5.9	7.1
Tridecane		6.7	5.0	5.2	4.1

TABLE 2

GENERAL VOC ANALYSIS RESULTS
HEAVY GROWTH MIXED MOLD SAMPLE
(µg/m³)

Hour Point/Collection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
Tridecane, 2-methyl		0.7	0.6	0.6	0.7
Tridecane, 3-methyl					
Tridecane, 4,8-dimethyl					
Tridecane, 4-methyl		0.6	0.6	0.6	0.5
Tridecane, 5-methyl					
Tridecane, 6-methyl		0.9	0.8	0.8	0.7
Tridecane, 6-propyl		2.8	2.2	2.1	2.3
Tridecane, 7-methyl		2.1	1.8	1.9	1.7
Tridecane, 7-propyl-					
TXIB (2,2,4-Trimethyl-1,3-pentanediol diisobutyrate)					
Undecane		2.3	1.3	0.9	0.8
Undecane, 2,4-dimethyl		2.3			
Undecane, 2,5-dimethyl					
Undecane, 2,6-dimethyl			0.4	0.3	0.3
Undecane, 2-methyl		0.3			
Undecane, 3,8-dimethyl		0.4	0.3	0.3	0.2
Undecane, 3-methyl					
Undecane, 4-ethyl					
Undecane, 4-methyl		1.4	0.7	0.5	0.3
Undecane, 5-methyl (8CI9CI)		2.7	1.4	0.9	0.6
Undecane, 6-ethyl		1.0	0.8	0.8	0.7
Xylene (para and/or meta)	0.2	0.5	0.4	0.3	0.4
Xylene, ortho	0.2	0.2	0.2	0.2	0.2
α-Methylstyrene (iso-Propenylbenzene; (1-Methylethenyl)benzene)				0.2	
Total VOCs	**8.1**	**167**	**119**	**106**	**99.2**

time and mass spectral characteristics with a probability of > 80%.

Individual volatile organic compounds are calibrated relative to toluene.

Quantifiable level is 0.04 µg based on a standard 18 L air collection volume.

Compounds with no values are found in one or more of the other samples

TABLE 3

GENERAL VOC ANALYSIS RESULTS
HEAVY GROWTH CHAETOMIUM GLOBOSUM SAMPLE
(µg/m³)

Hour Point/Collection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
(+)-Borneol		2.3			
(E)-3(10)-Caren-4-ol					
(E)-Nerolidol ((E)-3,7,11-trimethyl-1,6,10-dodecatrien-3-ol					
1,1'-Biphenyl (9CI)					
1,1'-Biphenyl, 2,2'-diethyl					
1,1'-Biphenyl, 4-methyl					
1,3,5-Heptatriene, (E,E)-					
1,3,5-Hexatriene, 3-methyl-, (Z)-					
1,3-Dioxane, 4,4-dimethyl-					
1,4-Cyclohexadiene, 1-methyl-		2.1	1.2	2.3	1.2
1,4-Pentadiene					
1-Butanol (N-Butyl alcohol)		0.3	0.3	0.3	
1-Decanol (N-Decyl alcohol)		0.7	0.9	1.0	1.0
1-Dodecanol					
1-Dodecene					
1H-2-Benzopyran-1-one, 3,4-dihydro-8-hydroxy-3-methyl-					
1-Heptanol					
1-Heptanol, 2-propyl (8CI9CI)			0.3		
1-Heptene				0.4	
1-Hexanol (N-Hexyl alcohol)					
1-Hexanol, 2-ethyl	0.3	11.5	10.2	9.5	8.7
1-Hexanol, 3-methyl					
1H-Indene, 2,3-dihydro-1,1,3-trimethyl-3-phenyl					
1-Octanol					
1-Octen-3-ol		0.8	0.7	0.6	0.6
1-Pentadecene					
1-Pentanol (N-Pentyl alcohol)					
1-Pentanol, 2-ethyl					
1-Pentanol, 3,4-dimethyl					
1-Propanol, 2-methyl (Isobutyl alcohol)					
1-Tetradecanol					
1-Tridecanol					
1-Undecene		0.7	0.4	0.4	
2' ,3' ,4' Trimethoxyacetophenone					
2,2,4,4,5,5,7,7-Octamethyloctane					
2,2,4-Trimethyl-1,3-pentanediol monoisobutyrate (Texanol)		5.4	5.8	5.8	5.4
2,2-Dimethyl-1-isopropyl-1,3-propanediol monoisobutyrate (Texanol)		14.0	13.6	14.0	12.6
2,2-Metaylenebiphenyl (Fluorene)			0.3		
2,3-Butanedione					
2,3-Pentanedione					
2,4-Pentanediol, 2-methyl (Hexylene glycol)					
2,5-Cyclohexadiene-1,4-dione, 2,6-bis(1,1-dimethylethyl)		4.0	3.8	3.8	3.5
2,5-Dimethyl-5-hexen-3-ol		1.2	1.0	0.9	1.0
2,6-Diisopropylnaphthalene					
2,6-Dimethyl-1,3,5,7-octatetraene, E					
2,6-Di-tert-butyl-4-methylphenol (BHT)					
2,6-Octadiene, 2,6-dimethyl-		0.9	0.8	0.9	0.6

TABLE 3

GENERAL VOC ANALYSIS RESULTS
HEAVY GROWTH CHAETOMIUM GLOBOSUM SAMPLE
(µg/m³)

Hour Point/Collection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
2-Butanol, 2-methyl					
2-Butanol, 3-methyl					
2-Butanone (Methyl ethyl ketone, MEK)					
2-Butanone, 3-hydroxy					
2-Butanone, 3-methyl					
2-Butanone, oxime					
2-Butenal, 3-methyl					
2-Cyclohexen-1-one, 3,5,5-trimethyl-				0.2	
2-Dodecene, (E)					
2-Dodecene, (Z)- (8CI9CI)					
2-Furanmethanol					
2-Furanmethanol, 5-ethenyltetrahydro-.alpha.,.alpha.,5-trime					
2-Heptanone		0.5	0.4	0.3	0.2
2-Heptanone, 6-methyl					
2-Hexanone					
2-Hexanone, 4-methyl					
2-Nonanone					
2-Nonenal					
2-Octanone					
2-Pentanol, 2-methyl					
2-Pentanol, 3-methyl			0.1		
2-Pentanol, 4-methyl (8CI9CI)			0.2		
2-Pentanone		0.5	0.3		
2-Pentanone, 3-methyl		0.4			
2-Pentanone, 3-methylene					
2-Pentanone, 4-hydroxy-4-methyl- (8CI9CI)					
2-Pentanone, 4-methyl (Methyl isobutyl ketone, MIBK)		0.3	0.2		
2-Propanol (Isopropanol)					
2-Propanol, 1-(2-methoxy-1-methylethoxy)			1.1	1.0	1.1
2-Propanol, 1-(2-methoxypropoxy)-		0.7	0.4	0.4	0.4
2-Propanol, 1-butoxy		2.8	2.5	2.6	2.4
2-Propanol, 1-methoxy (Dowanol)		1.6	1.5	1.8	1.7
2-Propanol, 1-propoxy		0.3	0.2	0.3	0.2
2-Propanol, 2-methyl					
2-Propenoic acid, 2-ethylhexyl ester (Iso octyl acrylate)		0.2	0.3		
2-Quinolinecarbonitrile, 4-methyl-					
2-Undecene, 8-methyl-, (Z) (9CI)		1.0	0.8	0.6	0.7
3,5-Dimethyldodecane					
3,7-Dimethyl-1,6-octadien-3-ol (Linalool)					
3-Buten-1-ol, 3-methyl-					
3-Buten-2-ol, 2-methyl					
3-Cyclohexen-1-ol, 4-methyl-1-(1-methylethyl)					
3-Cyclohexene-1-methanol, α,α,4-trimethyl		1.4	1.4	1.3	1.2
3-Ethyl-3-methylheptane					
3-Heptanone, 6-methyl					
3-Hexadecene, (Z)- (8CI9CI)					
3-Hexanone, 4-methyl		0.1			
3-Hexanone, 5-methyl					

TABLE 3

GENERAL VOC ANALYSIS RESULTS
HEAVY GROWTH CHAETOMIUM GLOBOSUM SAMPLE
(µg/m³)

Hour Point/Collection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
3-Hexen-2-one					
3-Octanol			1.0		
3-Octanone		9.5	6.1	7.7	6.0
3-Pentanol, 2-methyl					
3-Pentanone, 2,2-dimethyl-					
3-Pentanone, 2,4-dimethyl					
3-Pentanone, 2-methyl					
3-Penten-2-one, 4-methyl					
3-Tridecene, (Z)-		1.0	1.0	1.0	0.9
4-Tetradecene, (Z)-					
4-Undecene, 9-methyl-, (Z)					
5-Dodecene, (E)		0.4	0.2		
5-Hepten-2-one, 6-methyl					
6-Dodecene, (E)					
6-Undecanone					
7-Hexadecene, (Z)-					
7-Octen-2-ol, 2,6-dimethyl		1.5	1.6	1.1	1.3
Acenaphthene		1.8	1.7	1.8	1.4
Acetic acid					
Acetic acid, 1-methylethyl ester (Isopropyl acetate)		0.4			
Acetic acid, 2-ethylhexyl ester		1.2	0.9	0.9	0.8
Acetone		13.1	9.1	11.4	9.6
Acetophenone (Ethanone, 1-phenyl) (9CI)					
Anthracene, 1,2,3,4-tetrahydro-9-propyl-					
Benzaldehyde	0.2	1.4	1.2	1.1	1.1
Benzamide, N-(1,1-dimethylethyl)-4-methoxy-		0.7	1.1	1.1	1.0
Benzene, 1,2,3,4-tetramethyl		0.4	0.3	0.1	0.2
Benzene, 1,2,3-trimethyl		0.7			
Benzene, 1,2,4,5-tetramethyl					
Benzene, 1,2,4-trimethyl		0.5			
Benzene, 1,2-dimethoxy-					
Benzene, 1,3-dichloro					
Benzene, 1,3-diethyl					
Benzene, 1-ethyl-4-methyl (4-Ethyltoluene)					
Benzene, 1-methoxy-3-methyl					
Benzene, 1-methyl-4-(1-methylethyl) (p-Cymene; 4-Isopropyltoluene)	0.3	0.4	0.4	0.3	0.4
Benzene, 2-ethyl-1,4-dimethyl		0.3			
Benzene, ethyl	0.2	0.3	0.2	0.3	
Benzene, methoxy-					
Benzenemethanol, .alpha.-ethyl-.alpha.-methyl-, (.+/-.)-		4.2	2.7	2.6	2.1
Benzophenone (Diphenyl methanone)					
Benzothiazole		1.2	1.3	1.4	1.3
Bicyclo[2.2.1]heptan-2-ol, 1,3,3-trimethyl		1.3	1.3	1.2	1.0
Bicyclo[2.2.1]heptan-2-one, 1,7,7-trimethyl-, (1R)					
Bicyclo[2.2.1]heptan-2-one, 1,7,7-trimethyl-, (1S)		2.5	2.3	2.3	2.0
Bicyclo[3.1.0]hexan-3-ol, 4-methylene-1-(1-methylethyl)-, (1					
Bicyclo[3.1.1]hept-2-ene-2-carboxaldehyde, 6,6-dimethyl					

TABLE 3

GENERAL VOC ANALYSIS RESULTS
HEAVY GROWTH CHAETOMIUM GLOBOSUM SAMPLE
(µg/m³)

Hour Point/Collection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
Bicyclo[3.1.1]hept-3-en-2-ol, 4,6,6-trimethyl		1.4	1.4	1.3	1.1
Bicyclo[3.1.1]hept-3-en-2-ol, 4,6,6-trimethyl-, (1.alpha.,2.					
Bicyclo[3.1.1]hept-3-en-2-one, 4,6,6-trimethyl-					
Bicyclo[3.1.1]hept-3-en-2-one, 4,6,6-trimethyl-, (1S)-		0.8	0.8	0.9	0.8
Bicyclo[3.1.1]heptan-2-one, 6,6-dimethyl-					
Bicyclo[3.1.1]heptan-2-one, 6,6-dimethyl-, (1R)-		1.3	1.2	1.1	1.1
Bicyclo[4.1.0]heptane, 3,7,7-trimethyl					
Butane, 1-ethoxy		0.5	0.4	0.3	
Cyclohexadecane					
Cyclohexane, (1,2-dimethylbutyl)					
Cyclohexane, 1-(cyclohexylmethyl)-3-methyl-, trans					
Cyclohexane, 1,1'-(1,3-propanediyl)bis					
Cyclohexane, 1,2,4-tris(methylene)			1.8	1.5	1.2
Cyclohexane, decyl					
Cyclohexane, octyl					
Cyclohexanol					
Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1α,2ß,5α)-(+/-) (Menthol)		4.0	5.5	5.4	4.7
Cyclohexanone, 3,3,5-trimethyl					
Cyclohexasiloxane, dodecamethyl		7.4	5.9	6.0	4.8
Cyclooctane, 1-methyl-3-propyl-		0.8	0.7	0.6	0.5
Cyclopentane, 1-butyl-2-propyl (9CI)					
Cyclopentane, 1-pentyl-2-propyl					
Cyclopentane, methyl	1.0	0.7	0.7	0.9	1.1
Cyclopentasiloxane, decamethyl	0.3	30.3	19.4	22.4	15.3
Cyclopentene, 1,2-dimethyl-4-methylene-					
Cyclopropane, 1-hexyl-2-methyl					
Cyclotetradecane					
Cyclotetrasiloxane, octamethyl					
Cyclotrisiloxane, hexamethyl					
Decanal		0.9	0.8	1.0	0.8
Decane		1.7			
Decane, 2,3,5,8-tetramethyl-		4.5	3.4	3.3	2.4
Decane, 2,3,7-trimethyl (9CI)					
Decane, 2,4,6-trimethyl (9CI)		0.7	0.5	0.5	0.4
Decane, 2,5-dimethyl		0.9	0.8	0.8	1.2
Decane, 2,6,7-trimethyl (9CI)					
Decane, 2,6-dimethyl					
Decane, 2,9-dimethyl (8CI9CI)		1.3	0.6		
Decane, 2-methyl					
Decane, 3,3,5-trimethyl (9CI)		0.6	0.5	0.6	0.4
Decane, 3,6-dimethyl (8CI9CI)					
Decane, 3,7-dimethyl-					
Decane, 3-methyl					
Decane, 5,6-dipropyl-					
Dibenzofuran					
Dipropylene glycol monomethyl ether					
Disulfide, dimethyl					
Dodecane					

TABLE 3

GENERAL VOC ANALYSIS RESULTS
HEAVY GROWTH CHAETOMIUM GLOBOSUM SAMPLE
(µg/m³)

Hour Point/Collection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
Dodecane, 2,6,10-trimethyl		2.0	2.3	2.0	1.9
Dodecane, 2,6,11-trimethyl		1.2	1.4	1.5	1.3
Dodecane, 2-methyl					
Dodecane, 2-methyl-6-propyl					
Dodecane, 3-methyl (8CI9CI)					
Dodecane, 4,6-dimethyl (9CI)		0.9	1.0	1.1	
Dodecane, 4-methyl		0.2	0.2	0.5	
Eicosane					
Ethanol, 2-(dodecyloxy)					
Ethanol, 2-butoxy		2.8	3.0	3.1	2.9
Ethanol, 2-ethoxy					
Ethanone, 1-(1-cyclohexen-1-yl)					
Ethanone, 1-[4-(2-phenylethenyl)phenyl]-					
Ethyl-1-propenyl ether					
Formic acid, 1,1-dimethylethyl ester					
Formic acid, butyl ester					
Furan, 2-pentyl				0.4	
Heptadecane		0.9	0.9	0.8	0.9
Heptane			0.2	0.2	0.3
Heptane, 2,2,3,3,5,6,6-heptamethyl					
Heptane, 2,4,6-trimethyl					
Heptane, 2,4-dimethyl					
Hexadecane (Cetane)		1.8	1.8	1.9	1.9
Hexadecane, 2,6,10-trimethyl					
Hexadecane, 3-methyl		1.0	0.9	1.0	1.1
Hexadecane, 7,9-dimethyl		1.2	1.1	1.2	0.9
Hexadecane, 7-methyl-		0.3	0.2	0.3	
Hexanal					
Hexanal, 2-ethyl		1.1	0.7	0.8	0.6
Hexane	2.8	3.7	3.2	4.0	3.9
Hexane, 2-methyl	0.5	0.6	0.6	0.9	0.6
Hexane, 3-methyl	0.7				
Hexanedinitrile (9CI) (Adiponitrile)					
Hexanedioic acid, bis(2-ethylhexyl) ester					
Hexanenitrile		0.7	0.6	0.6	0.5
Limonene (Dipentene; 1-Methyl-4-(1-methylethyl)cyclohexene)					
Linalool oxide (fr.1)					
Naphthalene		2.2	1.9	1.4	1.5
Naphthalene, 1,4-dimethyl					
Naphthalene, 1-ethyl					
Naphthalene, 1-methyl					
Naphthalene, 2,3-dimethyl					
Naphthalene, 2,7-dimethyl					
Naphthalene, 2-methyl		0.9	1.1	1.1	0.9
n-Nonylcyclohexane					
Nonane					
Nonane, 2,5-dimethyl					
Nonane, 2,6-dimethyl		3.5			

TABLE 3

GENERAL VOC ANALYSIS RESULTS
HEAVY GROWTH CHAETOMIUM GLOBOSUM SAMPLE
(µg/m³)

Hour Point/Collection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
Nonane, 3,7-dimethyl					
Nonane, 3-ethyl					
Nonane, 4-methyl					
Nonane, 4-methyl-5-propyl					
Nonyl aldehyde (Nonanal)	0.3			0.5	0.4
Octadecane		1.0	0.9	0.9	0.5
Octanal					
Octane, 2,3,3-trimethyl-		0.2			
Octane, 2,3,6,7-tetramethyl-		0.6			
Octane, 2,3,6-trimethyl					
Octane, 2,4,6-trimethyl					
Octane, 2-methyl					
Octane, 6-ethyl-2-methyl		1.2			
Oxetane, 2,2-dimethyl-					
Oxirane, (1-methylethyl)-					
Oxirane, 3-ethyl-2,2-dimethyl-					
Pentadecane		4.9	4.3	4.6	4.0
Pentadecane, 2,6,10-trimethyl-					
Pentadecane, 2-methyl		1.2	1.1	1.3	1.1
Pentadecane, 3-methyl					
Pentadecane, 4-methyl		3.4	3.2	3.3	3.0
Pentadecane, 5-methyl					
Pentadecane, 7-methyl-		1.2	1.3	1.4	1.3
Pentane, 2-methyl			0.5		0.7
Pentane, 3-methyl	0.3		0.4	0.6	0.6
Pentasiloxane, dodecamethyl					
Phenol					
Phenol, 2,4-bis(1,1-dimethylethyl)-					
Phenol, 2,5-bis(1,1-dimethylethyl)		0.7	0.9	0.9	0.9
Phenol, 4-methoxy-3-(methyoxymethyl)-					
Phenol, 4-t-butyl (4-(1,1-Dimethylethyl)phenol)					
Propanoic acid, 2,2-dimethyl-, 2-ethylhexyl ester					
Propanoic acid, 2-methyl-, 2-(hydroxymethyl)-1-propylbutyl ester		4.1	3.6	3.5	2.9
Propanoic acid, 2-methyl-, 2-ethyl-1-propyl-1,3-propanediyl ester		7.7	7.7	7.4	7.3
Quinoline, 1,2-dihydro-2,2,4-trimethyl-					
Styrene		0.5	0.3		
t-2-Pentenal					
Tetradecane					0.9
Tetradecane, 2,6,10-trimethyl-		0.7	0.7	0.9	0.8
Tetradecane, 2-methyl			0.4	0.6	0.4
Tetradecane, 4,11-dimethyl					
Tetradecane, 4-methyl		0.8	1.2	1.2	1.2
Tetradecane, 5-methyl					
Tetradecanoic acid, 1-methylethyl ester (Isopropyl Myristate)					
Toluene (Methylbenzene)	15.3	14.7	13.8	17.7	18.2
Tridecane		5.8	3.1	3.0	1.9

TABLE 3

GENERAL VOC ANALYSIS RESULTS
HEAVY GROWTH CHAETOMIUM GLOBOSUM SAMPLE
(µg/m³)

Hour Point/Collection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
Tridecane, 2-methyl		0.5	0.6	0.7	0.5
Tridecane, 3-methyl					
Tridecane, 4,8-dimethyl					
Tridecane, 4-methyl		0.6	0.6	0.5	0.5
Tridecane, 5-methyl					
Tridecane, 6-methyl					
Tridecane, 6-propyl		0.5	0.7		
Tridecane, 7-methyl		0.7	0.6	0.6	0.4
Tridecane, 7-propyl-					
TXIB (2,2,4-Trimethyl-1,3-pentanediol diisobutyrate)		3.5	3.2	3.2	3.1
Undecane		1.7	0.9	0.8	0.6
Undecane, 2,4-dimethyl					
Undecane, 2,5-dimethyl					
Undecane, 2,6-dimethyl					
Undecane, 2-methyl					
Undecane, 3,8-dimethyl					
Undecane, 3-methyl					
Undecane, 4-ethyl					
Undecane, 4-methyl					
Undecane, 5-methyl (8CI9CI)					
Undecane, 6-ethyl					
Xylene (para and/or meta)	0.5	0.7	0.6	0.8	0.7
Xylene, ortho	0.2	0.3	0.3	0.3	0.3
α-Methylstyrene (iso-Propenylbenzene; (1-Methylethenyl)benzene)					
Total VOCs	**23.4**	**238**	**200**	**210**	**182**

time and mass spectral characteristics with a probability of > 80%.

Individual volatile organic compounds are calibrated relative to toluene.

Quantifiable level is 0.04 µg based on a standard 18 L air collection volume.

Compounds with no values are found in one or more of the other samples

TABLE 4

GENERAL VOC ANALYSIS RESULTS
HEAVY GROWTH STACHYBOTRYS CHARTARUM SAMPLE
(µg/m³)

Hour Point/Connection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
(+)-Borneol		1.7	1.3	1.2	1.1
(E)-3(10)-Caren-4-ol					
(E)-Nerolidol ((E)-3,7,11-trimethyl-1,6,10-dodecatrien-3-ol		1.5	0.9	0.7	0.7
1,1'-Biphenyl (9Cl)			0.8		
1,1'-Biphenyl, 2,2'-diethyl					
1,1'-Biphenyl, 4-methyl					
1,3,5-Heptatriene, (E,E)-					
1,3,5-Hexatriene, 3-methyl-, (Z)-					
1,3-Dioxane, 4,4-dimethyl-					
1,4-Cyclohexadiene, 1-methyl-					
1,4-Pentadiene					
1-Butanol (N-Butyl alcohol)					
1-Decanol (N-Decyl alcohol)		0.8	0.7	0.5	0.5
1-Dodecanol					
1-Dodecene					
1H-2-Benzopyran-1-one, 3,4-dihydro-8-hydroxy-3-methyl-		2.4	2.2	2.4	2.2
1-Heptanol					
1-Heptanol, 2-propyl (8Cl9Cl)					
1-Heptene					
1-Hexanol (N-Hexyl alcohol)					
1-Hexanol, 2-ethyl	0.3	7.7	5.6	5.8	6.0
1-Hexanol, 3-methyl					
1H-Indene, 2,3-dihydro-1,1,3-trimethyl-3-phenyl					
1-Octanol					
1-Octen-3-ol		0.5	0.5	0.4	0.4
1-Pentadecene					
1-Pentanol (N-Pentyl alcohol)					
1-Pentanol, 2-ethyl					
1-Pentanol, 3,4-dimethyl		0.2			
1-Propanol, 2-methyl (Isobutyl alcohol)					
1-Tetradecanol					
1-Tridecanol					
1-Undecene					
2' ,3' ,4' Trimethoxyacetophenone					
2,2,4,4,5,5,7,7-Octamethyloctane					
2,2,4-Trimethyl-1,3-pentanediol monoisobutyrate (Texanol)		3.1	2.6	1.9	1.2
2,2-Dimethyl-1-isopropyl-1,3-propanediol monoisobutyrate (Texanol)					
2,2-Metaylenebiphenyl (Fluorene)			0.2		
2,3-Butanedione					
2,3-Pentanedione					
2,4-Pentanediol, 2-methyl (Hexylene glycol)					
2,5-Cyclohexadiene-1,4-dione, 2,6-bis(1,1-dimethylethyl)		1.1	0.9	0.6	0.6
2,5-Dimethyl-5-hexen-3-ol					
2,6-Diisopropylnaphthalene					
2,6-Dimethyl-1,3,5,7-octatetraene, E					
2,6-Di-tert-butyl-4-methylphenol (BHT)					
2,6-Octadiene, 2,6-dimethyl-					

TABLE 4

GENERAL VOC ANALYSIS RESULTS
HEAVY GROWTH STACHYBOTRYS CHARTARUM SAMPLE
(µg/m³)

Hour Point/Connection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
2-Butanol, 2-methyl					
2-Butanol, 3-methyl					
2-Butanone (Methyl ethyl ketone, MEK)					
2-Butanone, 3-hydroxy					
2-Butanone, 3-methyl					
2-Butanone, oxime					
2-Butenal, 3-methyl		0.3	0.4	0.3	0.3
2-Cyclohexen-1-one, 3,5,5-trimethyl-					
2-Dodecene, (E)					
2-Dodecene, (Z)- (8CI9CI)		0.5	0.5	0.4	0.4
2-Furanmethanol					
2-Furanmethanol, 5-ethenyltetrahydro-.alpha.,.alpha.,5-trime		1.9	0.9	0.6	0.5
2-Heptanone			0.3		
2-Heptanone, 6-methyl					
2-Hexanone					
2-Hexanone, 4-methyl		0.9	0.5	0.1	
2-Nonanone					
2-Nonenal					
2-Octanone					
2-Pentanol, 2-methyl		0.3			
2-Pentanol, 3-methyl					
2-Pentanol, 4-methyl (8CI9CI)					
2-Pentanone					
2-Pentanone, 3-methyl					
2-Pentanone, 3-methylene					
2-Pentanone, 4-hydroxy-4-methyl- (8CI9CI)					
2-Pentanone, 4-methyl (Methyl isobutyl ketone, MIBK)					
2-Propanol (Isopropanol)					
2-Propanol, 1-(2-methoxy-1-methylethoxy)				0.7	0.9
2-Propanol, 1-(2-methoxypropoxy)-			0.3	0.2	0.2
2-Propanol, 1-butoxy		3.3	2.9	2.8	2.9
2-Propanol, 1-methoxy (Dowanol)		3.0	2.6	3.4	3.2
2-Propanol, 1-propoxy		0.5	0.3	0.4	0.4
2-Propanol, 2-methyl					
2-Propenoic acid, 2-ethylhexyl ester (Iso octyl acrylate)		0.5	0.3	0.3	0.3
2-Quinolinecarbonitrile, 4-methyl-		0.5	0.5	0.5	0.4
2-Undecene, 8-methyl-, (Z) (9CI)					
3,5-Dimethyldodecane					
3,7-Dimethyl-1,6-octadien-3-ol (Linalool)					
3-Buten-1-ol, 3-methyl-					
3-Buten-2-ol, 2-methyl					
3-Cyclohexen-1-ol, 4-methyl-1-(1-methylethyl)					
3-Cyclohexene-1-methanol, α,α,4-trimethyl		1.4	1.1	0.9	0.9
3-Ethyl-3-methylheptane					
3-Heptanone, 6-methyl					
3-Hexadecene, (Z)- (8CI9CI)					
3-Hexanone, 4-methyl					
3-Hexanone, 5-methyl					

TABLE 4

GENERAL VOC ANALYSIS RESULTS
HEAVY GROWTH STACHYBOTRYS CHARTARUM SAMPLE
(µg/m³)

Hour Point/Connection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
3-Hexen-2-one					
3-Octanol					
3-Octanone		5.1	4.2	5.0	4.5
3-Pentanol, 2-methyl					
3-Pentanone, 2,2-dimethyl-					
3-Pentanone, 2,4-dimethyl					
3-Pentanone, 2-methyl					
3-Penten-2-one, 4-methyl					
3-Tridecene, (Z)-		0.9	0.6	0.4	0.3
4-Tetradecene, (Z)-					
4-Undecene, 9-methyl-, (Z)		1.8	0.7	0.3	
5-Dodecene, (E)					
5-Hepten-2-one, 6-methyl					
6-Dodecene, (E)					
6-Undecanone		0.7	0.5	0.4	0.5
7-Hexadecene, (Z)-					
7-Octen-2-ol, 2,6-dimethyl					
Acenaphthene		1.7	1.5	1.9	1.3
Acetic acid					
Acetic acid, 1-methylethyl ester (Isopropyl acetate)					
Acetic acid, 2-ethylhexyl ester		1.3	1.0	1.0	0.9
Acetone		15.7	10.0	10.2	9.3
Acetophenone (Ethanone, 1-phenyl) (9CI)				1.4	1.3
Anthracene, 1,2,3,4-tetrahydro-9-propyl-					
Benzaldehyde	0.2	0.6	0.4	0.4	0.5
Benzamide, N-(1,1-dimethylethyl)-4-methoxy-					
Benzene, 1,2,3,4-tetramethyl					
Benzene, 1,2,3-trimethyl		0.7			
Benzene, 1,2,4,5-tetramethyl					
Benzene, 1,2,4-trimethyl		0.9	0.2		
Benzene, 1,2-dimethoxy-		5.8	5.1	5.0	4.9
Benzene, 1,3-dichloro					
Benzene, 1,3-diethyl					
Benzene, 1-ethyl-4-methyl (4-Ethyltoluene)		0.3			
Benzene, 1-methoxy-3-methyl					
Benzene, 1-methyl-4-(1-methylethyl) (p-Cymene; 4-Isopropyltoluene)	0.3	0.6	0.3	0.4	0.6
Benzene, 2-ethyl-1,4-dimethyl					
Benzene, ethyl	0.3	0.2	0.2	0.3	0.3
Benzene, methoxy-		0.9	0.6	0.7	0.6
Benzenemethanol, .alpha.-ethyl-.alpha.-methyl-, (.+/-.)-					
Benzophenone (Diphenyl methanone)		0.6	0.6	0.6	0.6
Benzothiazole					
Bicyclo[2.2.1]heptan-2-ol, 1,3,3-trimethyl		1.4	1.0	1.1	1.0
Bicyclo[2.2.1]heptan-2-one, 1,7,7-trimethyl-, (1R)					
Bicyclo[2.2.1]heptan-2-one, 1,7,7-trimethyl-, (1S)		1.6	1.2	1.1	1.1
Bicyclo[3.1.0]hexan-3-ol, 4-methylene-1-(1-methylethyl)-,					
Bicyclo[3.1.1]hept-2-ene-2-carboxaldehyde, 6,6-dimethyl					
Bicyclo[3.1.1]hept-3-en-2-ol, 4,6,6-trimethyl		1.8	1.3	1.4	1.2

TABLE 4

GENERAL VOC ANALYSIS RESULTS
HEAVY GROWTH STACHYBOTRYS CHARTARUM SAMPLE
(µg/m³)

Hour Point/Connection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
Bicyclo[3.1.1]hept-3-en-2-ol, 4,6,6-trimethyl-, (1.alpha.,2.					
Bicyclo[3.1.1]hept-3-en-2-one, 4,6,6-trimethyl-					
Bicyclo[3.1.1]hept-3-en-2-one, 4,6,6-trimethyl-, (1S)-		1.5	1.2	1.0	0.9
Bicyclo[3.1.1]heptan-2-one, 6,6-dimethyl-					
Bicyclo[3.1.1]heptan-2-one, 6,6-dimethyl-, (1R)-		0.8	0.6	0.6	0.6
Bicyclo[4.1.0]heptane, 3,7,7-trimethyl					
Butane, 1-ethoxy					
Cyclohexadecane					
Cyclohexane, (1,2-dimethylbutyl)		1.7	1.2	1.0	0.9
Cyclohexane, 1-(cyclohexylmethyl)-3-methyl-, trans					
Cyclohexane, 1,1'-(1,3-propanediyl)bis			0.4		
Cyclohexane, 1,2,4-tris(methylene)					
Cyclohexane, decyl					
Cyclohexane, octyl					
Cyclohexanol					
Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1α,2ß,5α)-(+/-) (Menthol)					
Cyclohexanone, 3,3,5-trimethyl					
Cyclohexasiloxane, dodecamethyl		3.8	2.9	2.7	2.4
Cyclooctane, 1-methyl-3-propyl-					
Cyclopentane, 1-butyl-2-propyl (9CI)		2.2	1.6	1.3	1.0
Cyclopentane, 1-pentyl-2-propyl					
Cyclopentane, methyl	1.3	0.7	0.8	1.4	1.2
Cyclopentasiloxane, decamethyl	0.4	34.1	26.3	29.8	25.3
Cyclopentene, 1,2-dimethyl-4-methylene-					
Cyclopropane, 1-hexyl-2-methyl					
Cyclotetradecane		1.1	0.8	0.4	
Cyclotetrasiloxane, octamethyl					
Cyclotrisiloxane, hexamethyl					
Decanal		1.0	0.5	0.4	0.6
Decane		2.3	1.1		
Decane, 2,3,5,8-tetramethyl-		7.3	5.6	5.3	4.3
Decane, 2,3,7-trimethyl (9CI)		1.8	1.3	1.0	0.8
Decane, 2,4,6-trimethyl (9CI)					
Decane, 2,5-dimethyl					
Decane, 2,6,7-trimethyl (9CI)					
Decane, 2,6-dimethyl		8.6	4.1	2.3	1.6
Decane, 2,9-dimethyl (8CI9CI)					
Decane, 2-methyl					
Decane, 3,3,5-trimethyl (9CI)					
Decane, 3,6-dimethyl (8CI9CI)					
Decane, 3,7-dimethyl-		3.9	1.8	1.0	0.8
Decane, 3-methyl					
Decane, 5,6-dipropyl-					
Dibenzofuran					
Dipropylene glycol monomethyl ether					
Disulfide, dimethyl					
Dodecane		2.5	1.8	1.6	1.3
Dodecane, 2,6,10-trimethyl		3.5	2.9	2.1	2.0

TABLE 4

GENERAL VOC ANALYSIS RESULTS
HEAVY GROWTH STACHYBOTRYS CHARTARUM SAMPLE
(µg/m³)

Hour Point/Connection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
Dodecane, 2,6,11-trimethyl		1.9	1.6	1.1	1.1
Dodecane, 2-methyl					
Dodecane, 2-methyl-6-propyl			0.6		
Dodecane, 3-methyl (8CI9CI)					
Dodecane, 4,6-dimethyl (9CI)		1.8	1.5	1.1	0.9
Dodecane, 4-methyl		0.8	0.5	0.3	0.2
Eicosane		0.4	0.3	0.3	
Ethanol, 2-(dodecyloxy)					
Ethanol, 2-butoxy		5.0	4.8	4.4	4.6
Ethanol, 2-ethoxy					
Ethanone, 1-(1-cyclohexen-1-yl)					
Ethanone, 1-[4-(2-phenylethenyl)phenyl]-					
Ethyl-1-propenyl ether					
Formic acid, 1,1-dimethylethyl ester			0.3		
Formic acid, butyl ester					
Furan, 2-pentyl				0.3	
Heptadecane		0.5	0.5	0.5	0.5
Heptane	0.3	0.3	0.2	0.4	0.4
Heptane, 2,2,3,3,5,6,6-heptamethyl					
Heptane, 2,4,6-trimethyl					
Heptane, 2,4-dimethyl		0.3			
Hexadecane (Cetane)					
Hexadecane, 2,6,10-trimethyl					
Hexadecane, 3-methyl		0.6	0.7	0.7	0.5
Hexadecane, 7,9-dimethyl					
Hexadecane, 7-methyl-					
Hexanal	0.2	0.2	0.2	0.2	0.2
Hexanal, 2-ethyl					
Hexane	3.7	3.6	3.2	4.7	3.9
Hexane, 2-methyl	0.8	0.7	0.6	1.0	0.8
Hexane, 3-methyl	1.0				
Hexanedinitrile (9CI) (Adiponitrile)					
Hexanedioic acid, bis(2-ethylhexyl) ester					
Hexanenitrile					
Limonene (Dipentene; 1-Methyl-4-(1-methylethyl)cyclohexene)		0.8	0.2		0.5
Linalool oxide (fr.1)					
Naphthalene		1.1	1.0	0.8	
Naphthalene, 1,4-dimethyl		1.0	0.7	0.5	0.4
Naphthalene, 1-ethyl					
Naphthalene, 1-methyl					
Naphthalene, 2,3-dimethyl					
Naphthalene, 2,7-dimethyl					
Naphthalene, 2-methyl		1.8	1.4	1.0	0.8
n-Nonylcyclohexane		0.5	0.8		
Nonane		0.2			
Nonane, 2,5-dimethyl					
Nonane, 2,6-dimethyl		3.7	1.5	0.2	0.9
Nonane, 3,7-dimethyl					

TABLE 4

GENERAL VOC ANALYSIS RESULTS
HEAVY GROWTH STACHYBOTRYS CHARTARUM SAMPLE
(µg/m³)

Hour Point/Connection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
Nonane, 3-ethyl		12.0	4.9	1.8	0.8
Nonane, 4-methyl		0.5	0.3		
Nonane, 4-methyl-5-propyl					
Nonyl aldehyde (Nonanal)	0.5				
Octadecane					
Octanal	0.2	0.6	0.3		0.3
Octane, 2,3,3-trimethyl-					
Octane, 2,3,6,7-tetramethyl-		1.9	0.8	0.4	0.3
Octane, 2,3,6-trimethyl		0.7	0.1		
Octane, 2,4,6-trimethyl		0.8			
Octane, 2-methyl		0.6			
Octane, 6-ethyl-2-methyl					
Oxetane, 2,2-dimethyl-					
Oxirane, (1-methylethyl)-					
Oxirane, 3-ethyl-2,2-dimethyl-					
Pentadecane		2.9	2.5	2.1	1.9
Pentadecane, 2,6,10-trimethyl-					
Pentadecane, 2-methyl		1.1	0.9	0.8	0.7
Pentadecane, 3-methyl					
Pentadecane, 4-methyl		3.2	2.7	2.6	2.3
Pentadecane, 5-methyl					
Pentadecane, 7-methyl-					
Pentane, 2-methyl	0.9		0.6	0.9	0.8
Pentane, 3-methyl	0.7		0.3	0.8	0.7
Pentasiloxane, dodecamethyl					
Phenol					
Phenol, 2,4-bis(1,1-dimethylethyl)-					
Phenol, 2,5-bis(1,1-dimethylethyl)					
Phenol, 4-methoxy-3-(methyoxymethyl)-					
Phenol, 4-t-butyl (4-(1,1-Dimethylethyl)phenol)					
Propanoic acid, 2,2-dimethyl-, 2-ethylhexyl ester					
Propanoic acid, 2-methyl-, 2-(hydroxymethyl)-1-propylbutyl ester					
Propanoic acid, 2-methyl-, 2-ethyl-1-propyl-1,3-propanediyl ester					
Quinoline, 1,2-dihydro-2,2,4-trimethyl-					
Styrene		0.6		0.4	0.3
t-2-Pentenal					
Tetradecane		4.9	4.0	3.4	2.7
Tetradecane, 2,6,10-trimethyl-			0.5		
Tetradecane, 2-methyl		1.9	1.6	0.7	0.8
Tetradecane, 4,11-dimethyl					
Tetradecane, 4-methyl					
Tetradecane, 5-methyl		0.7	0.6	0.1	0.3
Tetradecanoic acid, 1-methylethyl ester (Isopropyl Myristate)					
Toluene (Methylbenzene)	20.0	16.1	15.5	23.7	20.6
Tridecane		10.9	7.7	7.4	5.9
Tridecane, 2-methyl		1.2	0.9	0.7	0.6

TABLE 4

GENERAL VOC ANALYSIS RESULTS
HEAVY GROWTH STACHYBOTRYS CHARTARUM SAMPLE
(µg/m³)

Hour Point/Connection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
Tridecane, 3-methyl					
Tridecane, 4,8-dimethyl					
Tridecane, 4-methyl		1.3	1.0	0.8	0.7
Tridecane, 5-methyl					
Tridecane, 6-methyl		1.8	1.3	1.1	0.8
Tridecane, 6-propyl		4.3	3.6	3.2	3.0
Tridecane, 7-methyl		3.8	2.9	2.6	2.1
Tridecane, 7-propyl-		0.8	0.6	0.4	0.4
TXIB (2,2,4-Trimethyl-1,3-pentanediol diisobutyrate)					
Undecane		3.3	1.9		
Undecane, 2,4-dimethyl					
Undecane, 2,5-dimethyl					
Undecane, 2,6-dimethyl					
Undecane, 2-methyl		0.4			
Undecane, 3,8-dimethyl		2.0	1.3	1.2	1.7
Undecane, 3-methyl					
Undecane, 4-ethyl		1.3	0.9	0.7	0.6
Undecane, 4-methyl					
Undecane, 5-methyl (8CI9CI)					
Undecane, 6-ethyl		1.3	0.9	0.8	0.7
Xylene (para and/or meta)	0.7	0.7	0.7	1.0	0.8
Xylene, ortho	0.3	0.4	0.3	0.4	0.4
α-Methylstyrene (iso-Propenylbenzene; (1-Methylethenyl)benzene)					
Total VOCs	**32.2**	**259**	**191**	**183**	**162**

time and mass spectral characteristics with a probability of > 80%.

Individual volatile organic compounds are calibrated relative to toluene.

Quantifiable level is 0.04 µg based on a standard 18 L air collection volume.

Compounds with no values are found in one or more of the other samples

TABLE 5

MVOC TARGET LIST ANALYSIS RESULTS
LIGHT GROWTH MIXED MOLD SAMPLE
(ng/m³)

Hour Point/Collection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
1-Butanol	nd	1,089	980	952	808
1-Octen-3-ol	nd	1,040	739	676	629
2-Heptanone	nd	725	606	571	503
2-Hexanone	nd	513	372	438	442
2-Methoxy-3-1(methylethyl)pyrazine	nd	nd	nd	nd	nd
2-Methyl-1-propanol	nd	551	522	431	388
2-Methylisoborneol	nd	nd	nd	nd	nd
2-Nonanone	nd	nd	nd	nd	nd
2-Octen-1-ol	nd	nd	nd	nd	nd
2-Pentanol	nd	nd	212	232	146
2-Pentylfuran	nd	247	159	224	144
3-Methyl-1-butanol	nd	nd	nd	nd	nd
3-Methyl-2-butanol	nd	676	461	459	405
3-Methylfuran	nd	55.0	nd	9.0	nd
3-Octanol	nd	547	441	432	392
3-Octanone	nd	8,952	6,775	7,413	6,140
5-Methyl-3-heptanone	nd	nd	nd	nd	nd
Anisole	nd	9,221	6,484	7,771	5,756
Borneol	nd	nd	nd	nd	nd
Dimethyl disulfide	nd	225	172	239	184
Ethyl isobutyrate	nd	nd	nd	nd	nd
Fenchone	nd	nd	nd	nd	nd
Geosmin	nd	nd	nd	nd	nd
Isopropyl acetate	nd	1,106	663	737	518
Thujopsene	nd	nd	nd	nd	nd
α-Terpineol	nd	1,172	1,056	972	944
Total Microbial VOCs	**nd**	**26,119**	**19,642**	**21,557**	**17,399**

nd = not detected

AQS Method CLI019 for Analysis of VOCs using gas chromatography/mass spectrometry, modified for MVOCs following AIHA Field Guide.

Detection limit is 200 ng/m3 for 18 L collection volume. Numbers below the detection limit are reported for information purposes only.

TABLE 6

MVOC TARGET LIST ANALYSIS RESULTS
HEAVY GROWTH MIXED MOLD SAMPLE
(ng/m³)

Hour Point/Collection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
1-Butanol	nd	187	201	289	163
1-Octen-3-ol	nd	404	483	452	365
2-Heptanone	nd	340	254	207	192
2-Hexanone	nd	nd	nd	nd	nd
2-Methoxy-3-1(methylethyl)pyrazine	nd	nd	nd	nd	nd
2-Methyl-1-propanol	nd	nd	nd	nd	nd
2-Methylisoborneol	nd	nd	nd	nd	nd
2-Nonanone	nd	nd	nd	nd	nd
2-Octen-1-ol	nd	nd	nd	nd	nd
2-Pentanol	nd	nd	nd	nd	nd
2-Pentylfuran	nd	188	107	143	92.0
3-Methyl-1-butanol	nd	nd	nd	nd	nd
3-Methyl-2-butanol	nd	nd	nd	nd	nd
3-Methylfuran	nd	nd	nd	nd	nd
3-Octanol	nd	197	127	115	109
3-Octanone	nd	6,314	5,113	5,571	4,875
5-Methyl-3-heptanone	nd	nd	nd	nd	nd
Anisole	nd	1,357	1,242	1,789	770
Borneol	nd	509	510	635	447
Dimethyl disulfide	nd	275	257	256	157
Ethyl isobutyrate	nd	nd	nd	nd	nd
Fenchone	nd	nd	nd	nd	nd
Geosmin	nd	nd	nd	nd	nd
Isopropyl acetate	nd	2,914	1,476	1,150	1,069
Thujopsene	nd	nd	nd	nd	nd
α-Terpineol	nd	794	707	590	602
Total Microbial VOCs	**nd**	**13,479**	**10,476**	**11,197**	**8,842**

nd = not detected

AQS Method CLI019 for Analysis of VOCs using gas chromatography/mass spectrometry, modified for MVOCs following AIHA Field Guide.

Detection limit is 200 ng/m3 for 18 L collection volume. Numbers below the detection limit are reported for information purposes only.

TABLE 7

MVOC TARGET LIST ANALYSIS RESULTS
HEAVY GROWTH CHAETOMIUM GLOBOSUM SAMPLE
(ng/m^3)

Hour Point/Collection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
1-Butanol	106	1,157	1,063	1,116	962
1-Octen-3-ol	nd	632	620	821	767
2-Heptanone	nd	563	397	376	281
2-Hexanone	nd	324	227	205	177
2-Methoxy-3-1(methylethyl)pyrazine	nd	nd	nd	nd	nd
2-Methyl-1-propanol	nd	275	228	221	224
2-Methylisoborneol	nd	nd	nd	nd	nd
2-Nonanone	nd	nd	nd	nd	nd
2-Octen-1-ol	nd	nd	nd	nd	nd
2-Pentanol	nd	147	134	131	94.0
2-Pentylfuran	nd	203	120	187	115
3-Methyl-1-butanol	nd	nd	nd	nd	nd
3-Methyl-2-butanol	nd	591	482	430	360
3-Methylfuran	nd	nd	nd	nd	nd
3-Octanol	nd	1,063	904	892	782
3-Octanone	nd	9,039	6,335	7,715	5,977
5-Methyl-3-heptanone	nd	nd	nd	nd	nd
Anisole	nd	nd	nd	nd	nd
Borneol	nd	1011	862	935	843
Dimethyl disulfide	nd	175	101	226	137
Ethyl isobutyrate	nd	nd	nd	nd	nd
Fenchone	nd	294	229	243	183
Geosmin	nd	nd	nd	nd	nd
Isopropyl acetate	nd	1471	762	1068	666
Thujopsene	nd	nd	nd	nd	nd
α-Terpineol	nd	1,199	943	1,039	1,004
Total Microbial VOCs	**106**	**18,144**	**13,407**	**15,605**	**12,572**

nd = not detected

AQS Method CLI019 for Analysis of VOCs using gas chromatography/mass spectrometry, modified for MVOCs following AIHA Field Guide.

Detection limit is 200 ng/m3 for 18 L collection volume. Numbers below the detection limit are reported for information purposes only.

TABLE 8

MVOC TARGET LIST ANALYSIS RESULTS
HEAVY GROWTH STACHYBOTRYS CHARTARUM SAMPLE
(ng/m³)

Hour Point/Collection Rate	Background	Day 1/Low	Day 1/High	Day 2/Low	Day 2/High
1-Butanol	132	279	264	289	224
1-Octen-3-ol	nd	647	638	562	526
2-Heptanone	nd	309	195	205	171
2-Hexanone	nd	nd	nd	nd	nd
2-Methoxy-3-1(methylethyl)pyrazine	nd	nd	nd	nd	nd
2-Methyl-1-propanol	nd	93	103	156	123
2-Methylisoborneol	nd	nd	nd	nd	nd
2-Nonanone	nd	nd	nd	nd	nd
2-Octen-1-ol	nd	nd	nd	nd	nd
2-Pentanol	nd	nd	nd	nd	nd
2-Pentylfuran	nd	212	119	159	111
3-Methyl-1-butanol	nd	nd	nd	nd	nd
3-Methyl-2-butanol	nd	nd	nd	nd	nd
3-Methylfuran	nd	nd	nd	nd	nd
3-Octanol	nd	137	103	106	96
3-Octanone	nd	5,506	4,579	5,409	5,156
5-Methyl-3-heptanone	nd	nd	nd	nd	nd
Anisole	nd	1,245	901	1,242	999
Borneol	nd	699	619	600	620
Dimethyl disulfide	nd	214	122	315	149
Ethyl isobutyrate	nd	nd	nd	nd	nd
Fenchone	nd	109	91	97	84
Geosmin	nd	nd	nd	nd	nd
Isopropyl acetate	nd	503	331	399	nd
Thujopsene	nd	nd	nd	nd	nd
α-Terpineol	nd	1,088	906	986	956
Total Microbial VOCs	**132**	**11,041**	**8,971**	**10,525**	**9,215**

nd = not detected

AQS Method CLI019 for Analysis of VOCs using gas chromatography/mass spectrometry, modified for MVOCs following AIHA Field Guide.

Detection limit is 200 ng/m3 for 18 L collection volume. Numbers below the detection limit are reported for information purposes only.